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The Aqueduct of La Vanne.

THE beautiful city of Paris, with its many public fountains, fed by the waters of the renowned Grenelle and Passy artesian wells, and by the canal de l'Ourque, is yet sadly deficient in an ample supply of good water for domestic purposes. And, notwithstanding that the waters of the Dhuys have lately been brought within its walls, the greater part of the inhabitants of the city are yet dependent for their daily supply upon the water-cart, which furnishes filtered Seine water at 10 centimes *la voie*, (about 2 cents for ten gallons.)

The present administration, which has done so much for the improvement of Paris, has decided to bring to the city the pure and crystal-clear waters of La Vanne, a small river in the departements de l'Aube and de l'Yonne.

The distance from Paris to La Vanne is over one hundred and thirty-five miles; and as there are hills, valleys, roads, rivers, railroads, etc., to be crossed, it is easy to understand that the construction of an acqueduct through that country requires many fine works of engineering.

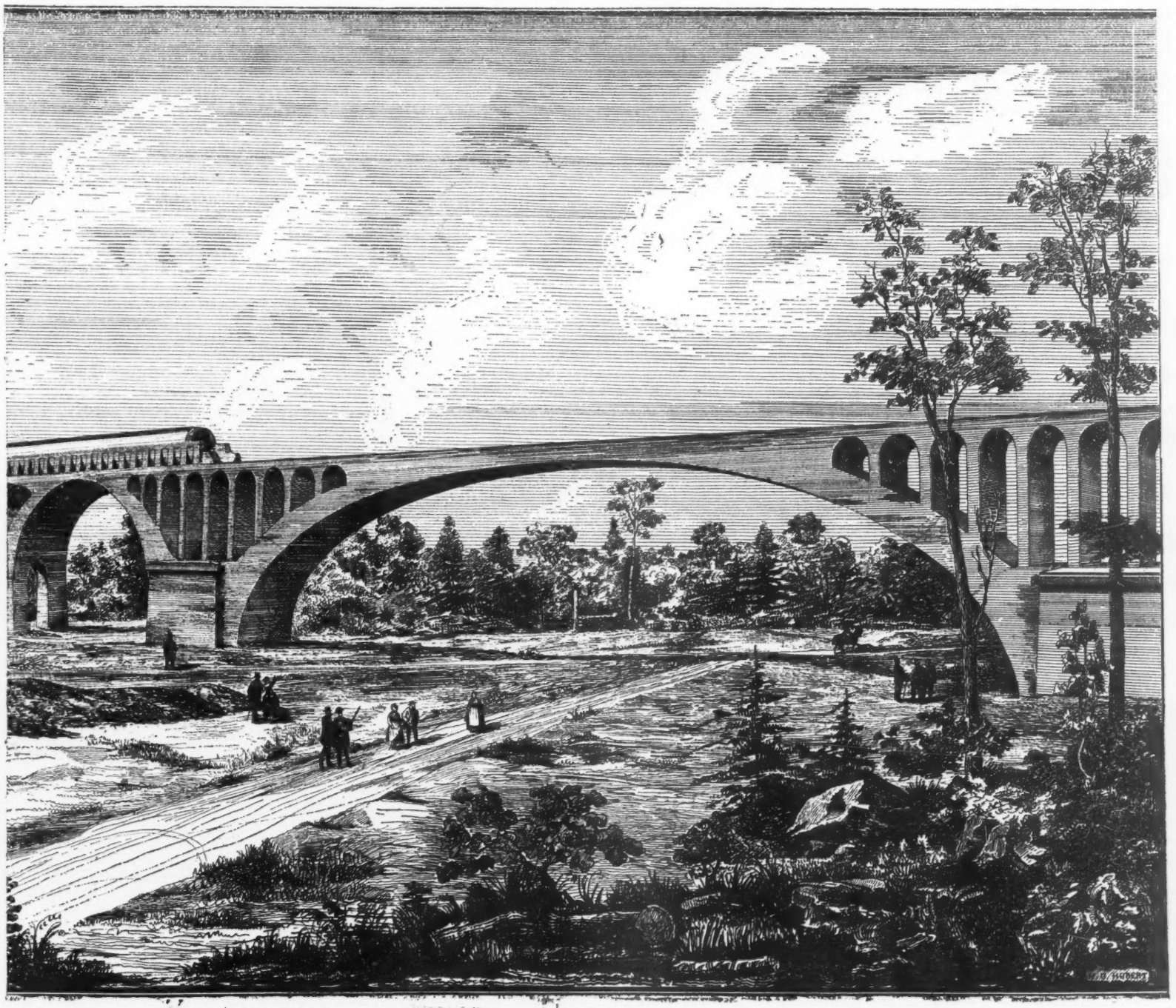
The section of this important undertaking which presented the greatest difficulties is the crossing of the forest of Fontainebleau, between the rivers l'Essones and Loing, a distance of some thirty-seven miles of alluvial formation, entirely destitute of good building material, and cut up by immense hills of almost impalpable silicious quicksand.

Mr. BELGRAND, the talented chief engineer of the water supply and sewerage of the city of Paris, undertook to apply, for the first time on such a gigantic scale, Mr. COIGNET'S system of monolithic construction of sand concrete to the erection of this difficult section of the grand acqueduct; and so successful was he in his attempt, that other sections of the work, formerly intended to be built of masonry, of cast-iron, and of boiler-iron plates, have been allotted to Mr. COIGNET, to be made by him entirely of his béton-aggloméré.

We propose to describe here only the part of the aqueduct of La Vanne which, from the fact of its being constructed entirely of sand concrete, has attracted so much attention among architects and engineers.

This aqueduct is not built of blocks of concrete cemented together by mortar, but it is actually all of one piece in its entire length. The whole structure for miles presents a gigantic monument of the intelligence of man, standing like a colossal work carved out of a huge block of stone. We present to our readers on the next page the first illustration of the *Arcade du Grand Maître* which has appeared in this country; and, we may add, the only correct representation of this interesting piece of engineering which has ever been printed anywhere. Our illustration was copied from a photograph taken before the conduit was completed along that portion of the work; and the proportions have been scrupulously preserved, so as to give a correct idea of the aqueduct as it stood then in the forest of Fontainebleau.

We have already several times mentioned Mr. Coignet's invention, and we propose at a future time to give our readers a practical and detailed description of the composition and mode of preparation of the different classes of béton-aggloméré; but it may not be out of place here to quote from the able report of the United States Commissioners to the Universal Exposition of 1867, that part which characterizes, among other building materials, the béton-coignet as capable, under the hand of the skilful architect, of assuming any shape which his imagination may suggest. In his report, Mr. L. F. BECKWITH remarks:



L'ARCADE DU GRAND MAITRE—AQUEDUCT OF LA VANNE.

"Common béton, or concrete, is a conglomeration of sand, pebbles, broken stones, common lime, and water. Common béton for marine use is a conglomerate of similar stones, hydraulic lime, and water. Béton-coignet, to which this memoir chiefly relates, is an *artificial stone* formed of sand, lime, and water, and is used in blocks, or in continuous masses, for foundations, walls above and below ground, sewers, water-pipes, floors, pillars, arches, embankments, aqueducts, reservoirs, cisterns, and the entire walls of buildings. The elements

are the same as those of common mortar for masonry; but the relative proportions of each, the method of making, and the results are different.

"*Theory of Concretion.*—Common mortar being composed of sand, lime, and water, the theory of its concretion may be briefly stated as follows:

"I. The chemical changes which occur from the contact of quicklime (oxide of calcium) and water produce hydrate of lime; and the subsequent absorption of carbonic acid from the air, displacing water, produces carbonate of lime.

"II. The strength and hardness of mortar result from the cohesion of sand and carbonate of lime, and from the crystallization of the carbonate of lime, which grasps and binds the grains of sand.

"III. Homogeneity depends upon the equal and uniform diffusion of the lime among the sand.

"IV. An excess of lime in proportion to sand produces great shrinkage and imperfect crystallization, and leaves the mass brittle and weak.

"V. An excess of water in proportion to lime cannot combine with it, but lodges between the particles of sand and lime, and by slow evaporation leaves the mass porous and friable.

"VI. The practical difficulties are, first, to find the proportions in which the elements will best combine; and second, to produce the conditions most favorable to their combination.

"*Observation.*—Common sandstone is usually composed of large quantities of silicious sand and small quantities of some cementing substance—oxide of iron, clay, carbonate of lime, etc., etc.; therefore,

"VII. The right elements being properly mixed, and in due proportions, each grain of sand enveloped in a coating of moistened lime, and all the grains brought into contact—the conditions, in short, being right—crystallization should be simultaneous and uniform throughout the mass.

"This line of thought pursued through a long series of experiments, has produced the béton-coignet, a kind of calcareous sandstone of great durability, admirably adapted to numerous and common wants, and of small comparative cost, its elements being found in abundance in all countries.

"Bétons cemented with different sorts of lime attain the same final solidity and strength, but require various periods of time for consolidation.

"Coarse sand makes a harder béton than fine sand, and the taking is stronger; clean river-sand, one-twentieth to three-twentieths of an inch in diameter, is best. All kinds, however, are used; and if it contains earthy particles, more lime is required. Fine sand requires greater care and more packing for consolidation."

The above was written in 1867; and last summer, in a paper which he read before the Society of Civil Engineers of France, Mr. COIGNET, in speaking of the aqueduct of La Vanne, remarked:

"This aqueduct, which traverses the forest of Fontainebleau through its whole length, comprises two and one-half to three miles of arches, some of them as much as fifty feet in height, and eleven miles of tunnels, nearly all constructed of the material excavated, the impalpable sand of marine formation known under the generic name of Fontainebleau sand.

"It includes, also, eight or ten bridges of large span, (seventy-five to ninety feet,) for the bridging of rivers, canals, and roads. This work was commenced about the middle of the year 1868, and is to be completed in three years. Already in eight months one-third of the work is finished. Several miles of arches are built. These arches are forty feet span, sixteen inches in thickness at the crowns, and in some instances are fifty feet in height.

"They have been constructed without interruption throughout the heat of summer and the frosts of winter, and have been entirely unaffected by either extreme of temperature. Built of ordinary masonry, similar arches ought not to have over twenty feet span; with a span of forty feet, they would be really wonderful; but they are all the more so, since they have been made of agglomerate, the base of which is the Fontainbleu sand, so fine that it never is used, even for making mortar. It would not be possible to find a more complete demonstration of the value of our process, since even with Fontainbleau sand we accomplish the boldest works; and so completely has this won the confidence of the engineer, that eight bridges, of from one hundred to one hundred and fifty feet span, which were to be built of iron, are now to be constructed entirely of agglomerate. This fact, more than any other thing I could say, bears testimony to the value of this material."

Last fall, the writer, in company with other engineers, visited the forest of Fontainbleu; and, after travelling for miles in the subterranean conduit, in some parts over one hundred feet underground, we emerged to the light again, to find ourselves upon the part of the aqueduct which is the subject of the present illustration; we also saw several of the large span bridges alluded to by Mr. COIGNET, finished and in course of construction, and were not a little surprised to learn that the centers were struck from under these gigantic arches, of such flat and bold design, on the *nineteenth day* after they had been completed.

The composition of the artificial stone of this grand aqueduct is different, according to the various parts of the work, the materials employed being as follows:

For foundation and underground walls:

Sand and gravel, equal parts	5 measures.
Hydraulic lime	1 "
Portland cement	¼ "

For the pillars, abutments, etc.:

Sand, and, in some cases, gravel	4 measures.
Hydraulic lime	1 "

For the main part of the arches, and for the bottom and sides of the conduit pipe:

Sand	4 measures.
Hydraulic lime	1 "
Portland cement	¼ "

For the keystones, or crown of the arches, and for the top of the conduit tube:

Sand	4 measures.
Hydraulic lime	1 "
Portland cement	¼ "

The proportions of the different materials are carefully preserved; the mixture, properly dampened, is triturated in a steam mill of the invention of Mr. COIGNET, and called by him a *malaxator*, which, acting by compression and friction upon the materials, turns out the artificial stone-paste in its characteristic form, ready to be used.

This artificial stone-paste is brought by a railroad and steam elevator to the spot where it is required; and there a gang of men is employed in agglomerating it in the moulds.

A few carpenters are constantly engaged in altering these moulds, by placing new pieces of moulds to the outside of the work already finished, and securing them ready for the agglomerators. In this manner the work progresses without any interruption from the foundation of piers to the keystone of the conduit. One day you see men filling the foundations; the next day, sides being fastened to form a mould, you will see the piers rise steadily. The day after, you will see these piers connected by centres, and the men already at work upon the arches. Then comes the cribbing of the conduit; and before long, the centres being struck, you behold a complete work, which has sprung up, as by enchantment, in less time than would have been consumed in the quarrying of the amount of stone required for such a piece of engineering.

The aqueduct of La Vanne is now almost completed, and it is the admiration of all who have visited it.

Mr. Coignet has once more established the fact that, by his system, it is perfectly practicable to erect works of engineering, in elevation, of remarkable strength, great elegance of design, and boldness of conception.

We have already stated that the béton aggloméré has from France been introduced successfully into England, Russia, Egypt, Italy, China, etc.; and we are glad to announce now that it is being introduced into the United States. A company, with ample means, has been organized, and we may expect to report soon what is being done in that line on this side of the ocean.

We are indebted for part of our information to the kindness of H. GENGEMBRE HUBERT, Esq, of No. 169 Broadway, in this city, who, having been Mr. COIGNET'S attorney, is well posted upon the interesting subject of his invention.

Geological Surveys of the Territories.

A speech delivered by Hon. R. C. MCCORMICK, of Arizona, in the House of Representatives, June 23, 1870.

MR. CHAIRMAN: Among other measures which I proposed to introduce upon coming here to represent the people of Arizona, was one for a geological survey of that territory. The need of such a survey I thus referred to, while acting as Governor, in a message to the Territorial Legislature so long ago as in 1865:

"The mineral treasures which underlie our soil, prodigious as they are known to be, are nevertheless as yet but in the infancy of their development. A portion of the territory nearly as large as the State of New York is yet wholly unexplored by the white man. The propriety of petitioning Congress for a geological survey will be among the subjects that will come before you for your consideration. In addition to gold, silver, and copper, lead, zinc, iron, cinnabar, alabaster, and marble, extensive deposits of lime and of rock salt, the latter in a state of crystallization, and of a very superior quality, have lately been found within our borders. A geological survey would largely benefit the agricultural interests by disclosing the different character of soils and their adaptability to certain crops; would in a measure determine the extent of our mineral wealth, point out the different kinds of rocks and veins and their respective positions; give an intelligent direction to mining enterprises, and furnish a mass of useful scientific information accessible to all, which cannot otherwise be obtained."

But I was met here by a request not to prepare a distinct bill for Arizona, but to join in favoring a liberal appropriation for the continuance of the geological survey of the several territories of the Union by Professor HAYDEN, under the direction of the Secretary of the Interior, as begun a year or two since. This appeared no more than a reasonable request, and with an understanding that Arizona would not be neglected by the Professor, as it has been by others, and the expectation that a sufficient appropriation would be made to enable him to conduct his survey in more than one territory at a time, I abandoned my purpose. I now find that the Committee on Appropriations has fixed a sum which seems to me quite inadequate to insure the prosecution of these surveys in a manner demanded by the best interests of the territories and of the country at large. An examination of the geological peculiarities of our frontier possessions should have been made many years since; but inasmuch as it has been delayed, no time should now be lost in completing it, and that in a thorough manner. Professor HAYDEN, in his letter to the Secretary of the Interior, (October 15, 1869,) transmitting his preliminary field report of the survey of Colorado and New Mexico, says the appropriation was so limited that, had it not been for the kindness and generosity of the military authorities of the country, he could have accomplished but a small portion of the work.

Mr. Chairman, a nation claiming to be liberal and progressive, should not hesitate to command the valuable assistance of geological science as an exponent of the mineral wealth of a country. Germany and England were the first nations to recognize the value of geological science in this connection. The rival schools of WERNER and HUTTON, although embracing many errors incident to that age, have been of immense value to the world, and by their efforts an impulse was given to geological inquiry which extended across both hemispheres. A recent writer remarks that—

"The application of geology, with the supplementary science of mineralogy, has added millions of treasure to the German States. Mineral wealth has been discovered, commerce extended, new industries created in localities which were previously deemed barren and worthless, mining schools have been established, statistics collected, economical geology in relation to mining has been fostered, science has been enriched by new discoveries, and the horizon of knowledge thereby extended."

Emulating these examples, many of our States have, with a view of ascertaining the relative value of their possessions, caused geological surveys to be made. To common sense, this would seem to be the duty of every State, and more especially is this necessary when the physical contour of the country gives evidence of mineral wealth. In the case of the Territories, it becomes the duty of the general Government to bestow the benefits to be secured from geological science. No districts in the world present so inviting a field for geological research as the mineral-bearing Territories of the United States. Here nature solicits inquiry in every river, gulch, placer, and mountain. For the want of scientific knowledge and investigation, millions of dollars have been wasted in the exploration of the Territories; in looking for precious metals where they were not to be found, and in attempts to work ores which could not, under any circumstances, be made to pay. It is of the first consequence that the men who are occupying and striving, in the face of many difficulties, to develop the Territories, should be guided by the light of science, and, in my judgment, the Government should provide such, even at a large expense. No investment of the public moneys will be wiser, or likely to return a better yield. The Senator from Nevada, (Mr. Stewart), in one of his sensible speeches on behalf of a national School of Mines, an institution which might be of incalculable benefit to the country, and should speedily be founded, thus alluded to this matter:

"It is important for the man who hunts for precious metals to know where there is a possibility that they will be found, and equally important to know where they certainly will not be found, if such knowledge is attainable. Practical experience of individual miners undoubtedly assists in directing the attention of the prospector to the proper fields for his exploration; but it takes years to acquire this experience. The labor of thousands, constituting a large majority of the miners of the Pacific, has been utterly wasted in vain attempts to find mines where geology teaches mines cannot exist. If these men could have had the experience of mankind to have guided them in their investigations, millions of dollars and years of toil might have been saved and directed to some useful purpose."

Gentlemen upon this floor are too apt to forget the vast size of the Territories, and the need of large appropriations for exploring them. They also seem to overlook the extent of promising country that is yet unexplored. There is in the Territory of Arizona alone, as stated in the extract from my message just quoted, a district nearly as large as the State of New York yet unexplored, and in many parts unentered by the white man, the veriest *terra incognita* upon the continent. There is every reason to believe that this great district is even richer in the precious and valuable metals than those parts of the Territory already well known. The mountain ranges connect those which in Nevada, Sonora, and Chihuahua, have proved so remarkably opulent.

I say to gentlemen who complain that the Territories do not yield more, that they should do more towards their exploration, and the aid and protection of their enterprising inhabitants. It is folly, as in the case of Arizona, to demand a revenue when the lands are unsurveyed, and large parts of the Territory remain unexplored—when little is really known of its resources, and life and property are nowhere secure.

For one, after years of residence there, I have great confidence in its mineral and other resources, but I know the lack of intelligent investigation and scientific exploration. I hope, therefore, that this appropriation for Professor HAYDEN'S surveys will be so increased that the work may be promptly and vigorously prosecuted by an able corps of men, not only in this Territory, but in others. I cannot give a better illustration of the urgent need of it, than by stating to you that the remarkable silver ledges lately discovered upon the borders of Arizona and New Mexico, and which are exciting the wonder of the geological world, lie within a very few miles of the thirty-second parallel overland route—a favorite route for the Southern Pacific railroad, and one which has been much travelled for a quarter of a century. I take the following brief allusion to these most extensive deposits of silver from the letter of a correspondent:

"The ledges already located amount in the aggregate to over ten miles in length, and yet new ledges are being discovered and locations made daily. I have not yet heard of a single location but has the ledge in sight on some portion, while hundreds of them have their outcroppings the entire length of the mine. There are three ledges which may be considered the main trunks or arteries, varying in width from ten to twelve hundred feet, and in one or two places as wide as one thousand feet, cropping high above the ground for miles, more resembling the great wall of China than anything known in history besides; and these time-defying barriers, standing firm and erect, pointing with their jagged crests to the zenith, maintain a height varying from fifty to five hundred feet perpendicular. One chimney or blow-out on the Brown ledge has an elevation of one thousand feet or more above the country generally, and may be seen a distance of thirty or forty miles. A tunnel may be made to tap and drain this mine one thousand or fifteen hundred feet below the top croppings with less than one thousand feet of tunnel." * * *

"I have visited many different ledges in various portions of the district, and to my utter astonishment they all exhibited the same general and uniform appearance, and show the best indications known in silver quartz. Fine specimens of various characters, both as to combinations and riches, have been found in many of the ledges, while it is a very common and easy matter to procure specimens of nearly all the different forms in which silver exists, from the same ledge and even the same claim. I will venture this much, that right there exists the greatest and richest oasis in the world. Any attempt to give a pen description by which even a practical miner, meteorologist, or mineralogist can realize in a faint degree the magnitude of these ledges must ever be futile. Nothing in history has any resemblance. The famous and world-renowned mines of Mexico and Peru fall into utter nothingness when brought into comparison with this grand argentiferous deposit."

Let it be remembered that the mountains containing these rich ledges have been looked upon by thousands of travelers, have been passed and repassed for years, and yet for the want of geological knowledge have been considered to consist only of granite, and the secret of their great value has been delayed to this late hour and now made known by the merest accident.

Surely in this day of enterprise and progress steps should be taken by the government to obtain without delay a correct understanding of the resources of all its possessions, and to give

its people everywhere all the benefits that science can afford. The increase of this appropriation would seem to be the more reasonable, from the fact that only $10,000 is allowed by this bill for continuing the collection of statistics of mines and mining, a matter of the greatest importance to the nation, and one for which any other government in the world would, I undertake to say, consider this a most meager and insufficient appropriation. The reports made to this time by Messrs. BROWNE and RAYMOND, the United States commissioners, have been of great interest and value, not only at home but abroad. They are in constant request, and have done much to invite attention to the territories, to attract capital, and to create interest in mining as an industry. The Commissioner of the General Land Office informs me that for these as well as for HAYDEN'S report he has frequent applications from foreign countries and governments, and that for all such publications, including, I may add, the valuable reports of the Land Office and maps of the States and Territories, which Congress is so reluctant to print, and yet which are so necessary to a proper exhibition of the extent and greatness of the country, there is a growing demand. No works are better calculated to tempt immigration or to attract foreign capital to the territories.

Mr. Chairman, all the recent appropriations of Congress for explorations and investigations in connection with the resources of Territories, have been exceedingly limited. Take, as instance, the sum of $12,000, voted a few days since, in another appropriation bill, to enable Captain POWELL to perfect a scientific report upon his valuable explorations of the great Colorado of the West. The only exploration of importance, or to be relied upon, of a portion of that river, nearly one thousand miles in extent—all of it, indeed, excepting that part explored and written upon by Lieutenant IVES. To more than $50,000 given by societies and individuals toward the necessary expense of these explorations by POWELL, the Government has added the trifling sum of $12,000. And yet this river has been well termed the Mississippi of the Pacific, and is one of the largest and most interesting in the world.

I know the country is largely in debt, and that this Administration is sincerely studying economy; but surely, to limit appropriations for scientific explorations and investigations, calculated to be of such great value to the nation and to the world, is in no sense economy, but rather the opposite, and will, I think, be so considered by the people, who, although anxious to avoid all unnecessary and extravagant expenditures, are yet as ready as ever to encourage enterprise and promote intelligence, and earnestly desire the earliest and most complete information upon the resources of the great Territories of the West, the destined homes of millions of freemen.

Recent Improvements in Regenerative Hot-Blast Stoves for Blast-Furnaces.

An abstract of a paper on the above subject, read by Mr. E. A. COWPER, C. E., at the Institution of Civil Engineers, is published in the *Mining Journal*. Mr. COWPER stated that when in 1828, the late Mr. J. B. NEILSON, M. Inst. C. E., introduced the plan of heating the air employed as blast by means of iron pipes placed in or near a fire, the increase of temperature was at first only from 60° to 100° Fahr. Subsequently Mr. NEILSON, obtained a temperature of 600° or 650°, and the pipe stoves had since been urged up to 900°, and in a few cases to 1000°. The wear and tear, however, with such temperatures of blast, were considerable; there was great loss of heat by conduction, and the pipe stoves were, as a rule, worked in a leaky condition, necessitating the expenditure of engine-power for blowing air uselessly. The improvements described in the paper were based upon Mr. SIEMENS' regenerative furnace. Each stove of a pair consisted of a wrought-iron cylindrical casing, lined with fire-brick, and provided with a central shaft or flue, which extended to within a few feet of the brick dome forming the top. Around this shaft there were a number of compartments or boxes, formed of bricks, so placed that those in one course were not exactly coincident in position with those in the courses either above or below, though a passage was left open from the bottom to the top of the mass of brickwork. This wrought-iron casing was provided with several valves, three being for the admission of cold-blast, of gas, and of air for consumption,, and two being for the exit of the hot-blast and the products of combustion. When a stove had been at work heating blast, and it was wanted to re-heat it, the first thing to be done was to put another stove in operation, then to shut the hot and the cold-blast valves, allowing the air in the stove to be blown out a small valve to reduce it to atmospheric pressure. The gas, air, and chimney-valves were next opened, and the gas, igniting as it entered, gave a large volume of flame right up the central shaft and over and into the regenerator, thus heating the top course of brick-work considerably, the next course rather less, and so on, the products of combustion passing away to the chimney at a temperature of about 300°. In the course of a few hours a large amount of caloric was stored up in the bricks forming the regenerator, a good red heat penetrating nearly to the bottom, when the stove was again ready to heat the blast to a temperature of 1400° or 1500°. In these stoves the cost of dust-catchers was avoided, and the expense of producing gas was also saved, as the gas was used direct from the top of the blast-furnace, and the stoves could be cleaned out with the greatest facility. The construction of the regenerator in compartments, or boxes, connected together vertically, but not horizontally, gave the power of applying the blast with efficiency (inasmuch as the whole force of the blast was confined to the one passage that was being blown at the time), and admitted of a brush being passed up or down the boxes to remove the dust. The form and proportion of the passages had been found, after numerous experiments, to produce an excellent effect in mixing the air, thereby ensuring a rapid and perfect conduction of heat from the bricks to the air, or vice versa, from the process of combustion to the bricks. The results obtained by Messrs. COCHRANE from the adoption of these stoves at Ormesby, as regarded the quality of iron, the increased make, and the saving of coke in the blast-furnace, had been most satisfactory. Thus, there was a saving of four cwts. of coke per ton of iron, produced by the use of the regenerative stoves for heating the blast, when compared with good cast-iron pipe stoves, and the saving was still more over ordinary pipe stoves. With a large furnace, producing four hundred and seventy-five tons a week, the first cost of these stoves was somewhat less than the cost of pipe stoves, while the expense of working was less, so that the profit, taking everything into account, was estimated to amount to about £4,162 a year.

Iron Sands.

From Notes on Iron and Iron Ores, by T. STERRY HUNT.

THE silicious sands of most regions contain a greater or less proportion of heavy black grains, which consist chiefly of some ore of iron. The source of these is easily traced to the crystalline rocks, which, by their disintegration, have given rise to the sands, and which, in addition to occasional beds or masses of iron ores, generally hold disseminated grains of magnetite, hematite, titanic iron, (menaccanite or ilmenite of mineralogists), and more rarely, chromic iron ore. In the process of washing earth and sand for gold, diamonds, or tin ore, considerable quantities of these black iron sands are met with, and, from their high specific gravity, remain when the lighter portions are washed away. The chromic iron ore is comparatively rare, and confined to certain districts; the hematite, with the exception of some crystalline varieties, is generally too soft to resist the abrading forces which have reduced the solid rock to sand, so that the black grains, in most districts. consist chiefly of magnetic and titanic iron ores. In the gold-bearing alluvions of the Chaudière regions in Canada, the sands obtained in washing for gold, when purified as much as possible by washing. were found to hold eighteen per cent. of magnetic iron. The non-magnetic portion was soluble in acids and fused bisulphate of potash, with the exception of 4.8 per cent. of silicious residue, and the solutions contained, besides iron, a considerable proportion of chromium, and 23.15 per cent. of titanic acid, derived from the titanic ore, which made up a large portion of the sand. ("Geology of Canada," page 520.)

The proportion of these ores to the whole mass of ordinary silicious sands is, generally, by no means large, but the action of moving water effects a concentration of the mixture, separating the lighter silicious grains more or less completely from the heavier portions, which consist chiefly of the iron ores, generally with a small quantity of grains of garnet. This separation is effected, on a large scale, by the action of the sea, under the influence of the winds and tides, and the result of this action occasionally gives rise to remarkable accumulations of these heavy iron sands along the present sea beaches. A similar process in past ages, during the deposition of the stratified sands, which are now found at heights above the sea level, has sometimes arranged the iron grains in layers, which are seen to alternate with the lighter silicious sands, as in the deposits of to-day.

Accumulations of these iron sands are met with in many countries. They are found on the shores of Great Britain, along the borders of the Baltic and the Mediterranean, and abundantly on the coast of New Zealand. In some parts of Hindostan and Madagascar, the grains of iron ore are extracted by washing from the sands of the country, and employed by the natives in their primitive furnaces, for the manufacture of iron on a small scale. The iron sands of New Zealand have of late attracted particular attention from their great extent and richness. According to HOCHSTETTER, the shore of the northern island, from Kaipara to Taranaki, a distance of one hundred and eighty miles, is bordered with a thick layer of iron sand, which contains, according to different analyses, from six to eleven per cent. of titanic acid.

In North America, black iron sands abound in many places. They occur in great quantities in the lower St. Lawrence, as will be hereafter described, and are met with, in smaller amounts, at various points to the south-westward, along the valley of the St. Lawrence and the great lakes. Thus, a deposit of black sand at the outlet of Lake Huron, near Sarnia, attracted some attention a few years ago; while along the north shore of Lake Erie this sand is, in some places, found in such quantity that attempts were, it is said, made, more than twenty-five years since, to collect it and smelt it with an admixture of bog ore, which was then treated in a blast-furnace at Normandale, Norfolk county, Ontario.

These black sands are likewise met with at various points along the coast of the United States, particularly on the shores of Connecticut, where they early attracted the attention of the colonists, and were successfully worked more than a century since. The following details relating to the history of these early and little-known trials are so interesting that I may be pardoned for introducing them here. It appears by a letter from Mr. HORNE, a steel-maker and cutler of London, addressed to Mr. John ELLICOT, F.R.S., and read before the Royal Society of London March 3, 1763, that, at that time, the Society for the Encouragement of Arts and Manufactures was occupied with the question of the Virginian black sand, as it was called. Already, before 1742, one Dr. MOULEN, of the Royal Society, had made some unsuccessful experiments to determine the nature of this magnetic sand, but in that year Mr. HORNE, having procured a quantity of it, succeeded, as he tells us, in extracting from it more than one-half of its weight of fine malleable iron. He seems, however, to have published nothing upon the subject until after Mr. JARED ELLIOT had made known, twenty years later, by a pamphlet and a letter addressed to the Society of Arts, and subsequently by a letter in reply to Mr. HORNE'S inquiries, that he was then making malleable iron from the black sands, in blooms of fifty pounds and upwards, by direct treatment in a common bloomary fire, a process which seems, from his letters, to have been one familiar to him. He describes the ore as yielding sixty per cent. of malleable iron, and as being very abundant, and so free from impurity as to require the addition of cinder or bog ore. This manufacture of iron from the sand had evidently been somewhat developed, for, according to Mr. ELLIOT, his son had already erected a steel furnace, before the act of Parliament was passed prohibiting the manufacture of steel in the colonies. Specimens of the steel there produced were examined by Mr. HORNE, and found to be of excellent quality, very tough, and not at all red-short.*

Throughout the essay of Mr. HORNE the sand-ore is spoken of as coming from Virginia, a name which, in the reign of Elizabeth, was given to the whole American coast from Canada to Florida, although in 1643 the name of New England was applied to the region which still bears that name. It appears, however, that the so-called Virginia sand was from the coast of Connecticut. Mr. ELLIOT'S letter to Mr. HENRY HORNE was dated Killingworth, October 4, 1762. Killingworth is a town in the State of Connecticut, on the shore of Long Island Sound, twenty-five miles east of New Haven, and was the residence of the Rev. JARED ELLIOT, D. D., who was not only a divine, but a physician, and a naturalist of great repute. It is recorded of him that "some considerations had led him to believe that the black sand, which appears originally on the beach of the sound, might be wrought into iron. He made an experiment upon it in the year 1761, and succeeded. For this discovery he was honored with a medal by the society instituted in London for the Encouragement of Arts, Manufacturers and Commerce."†

Notwithstanding this successful result, the iron sands seem to have been neglected for the last century, both in America and in Europe. We read, it is true, that such sands are treated in open hearths (bloomaries) at Avellino, near Naples, and within a few years attempts have been made in England to turn to use the iron sands of New Zealand; but the first successful attempts in this county were on the north shore of the lower St. Lawrence. The great deposits of black iron sand on the beach near the mouth of the Moisie river, having attracted attention, various attempts to reduce it were made. In January, 1867, Mr. W. M. MOLSON, of Montreal, had the ore successfully treated by the bloomary processs, in northern New York, and the result proving satisfactory, several bloomary furnaces were, in 1867, constructed by him at Moisie, and have since been in successful operation.

It will here be well to notice the nature and the composition of the iron sand at Moisie, as observed by myself in the summer of 1868. The stratified sands at Moisie, lying about ten feet above high-water mark, penetrated by the roots of small shrubs, and holding marine shells, were observed to be banded by irregular dark colored layers, in which the iron ore predominated. The same thing was afterwards remarked by me in stratified sands at much higher levels in the vicinity. Where these sands form the beach they are exposed to the action of the waves, which effect a process of concentration on a grand scale, so that, it is said, after a prevalence of certain winds, great belts of nearly pure black sand are exposed along the shore. At the time of my visit trenches were being sunk to a depth of five feet on the shelving beach, about half way between high and low-water mark. The sections presented alternations of nearly pure silicious sand and of black iron sand, the latter in layers of from half an inch to six inches in thickness, often with a small admixture of grains of red garnet, which sometimes formed very thin coatings upon the surface of the black layers. One of these latter, six inches in thickness, was taken up by myself, and found to be very pure, as will be seen by its analysis farther on. It was easy from these trenches, by means of shovels, to remove, without much admixture, the thicker layers of the moist black sand, which would measure from one and a half to two feet out of the five feet excavated. This material was piled upon the beach, and afterwards carried to the washing-table. The supplies of sand-ore have hitherto been obtained from the deposits of wet sand below high-water level. Those at the surface, on the beach, have doubtless been recently moved by the waves, but from the inspection of the layers in the trenches I was led to the opinion that they were lower strata, similar to those seen above the high-water mark, and, like them, of considerable antiquity. They were found to contain marine shells in a crumbling and decayed condition. It is said that these mixed sands of the higher levels yield on an average, by washing, about fifteen per cent. of black iron sand. When this poor sand is spread upon the shore and exposed to the action of the waves and the tide, it is found to become concentrated through the washing away of the silicious grains. This process helps us to understand the mode in which the irregular layers of rich iron sand have been formed in the midst of the deposits of silicious sand, in the strata which are now above the sea level.

The washing of the ore at Moisie, preparatory to smelting, is done upon a shaking-table, about twenty feet long and four feet wide, with a sloping and somewhat concave bottom. Upon this, by the aid of a gentle current of water, a large part of the lighter grains, chiefly of quartz, are washed away.

The specific gravity of the sand, in bulk, was determined by weighing one hundred measured cubic centimeters of it, equivalent to one hundred grammes of water; and the proportion of grains of magnetic ore was also determined. Of three specimens from Moisie; A was an average sample of several hun-

* These curious details are extracted from a rare volume, entitled "Essays concerning Iron and Steel," (the first of the three essays being on "The American Sand-Iron,") by HENRY HORNE, London, 1773. 12mo, pp. 223. A copy of this scarce book is in the possession of W. M. B. HARTLEY, Esq., of New York.

† BARBER'S "Historical Collections of Connecticut," page 531. The Rev. JARED ELLIOT, who was a grandson of the celebrated JOHN ELLIOT of Massachusetts, the "Apostle of the Indians," died in 1763, aged seventy-eight years.

dred tons gathered in the manner just described, preparatory to washing; B, a portion taken by myself from a layer six inches thick, about three feet below the surface of the beach; and C, the washed ore, as prepared for the bloomary fire. In this connection are given the results of some similar determinations with iron sands from other localities.

	Specific gravity.	*Magnetic.*
Moisie, A	2.82	46.3 per cent.
Moisie, B	2.88	49.3
Moisie, C	2.97	52.0
Mingan	2.84	48.3
Bersimis	2.81	34.3
Natasquan	—	55.7
Kagashka	—	24.0
Batiscan	—	55.0

The specific gravity of the silicious sand with which these iron sands are associated, was found, when determined in bulk, as above, to be about 2.00. It consists chiefly of quartz, whose real specific gravity is about 2.65; that of magnetic iron ore being about 5.18, while the titanic iron ore is about 4.70, and the associated garnet not far from 4.0. The amount of material removed in the process of washing at Moisie is not very great, as may be seen by comparing the proportion of magnetic grains in A and C, the Moisie sand before and after washing. The latter was found by analysis to contain about 5.5 p. c. of insoluble matter, chiefly silicious sand, the remainder being almost entirely oxyd of iron and titanic acid.

The sand of Batiscan, mentioned above, had been purified by washing. Considerable deposits near Champlain, contain, according to Dr. LARUE, about 10.0 per cent. of magnetic ore, the remainder being chiefly silicious sand. The specimens from Bersimis, Mingan, Natasquan and Kagashka, however, though collected, as I was informed, without washing, compare favorably with those from Moisie, and, with the exception of Bersimis, even surpass it in the proportion of magnetic ore. I am indebted for all of these to Dr. LARUE, the professor of chemistry in Laval University, Quebec, who has paid much attention to the iron sands of the lower St. Lawrence, and collected himself the specimen from Bersimis, of which locality he has given me some interesting notes. Besides the considerable accumulations of sand on the beach, he observed, about three feet above high-water mark, two layers of black sand, holding about 30 per cent. of magnetic ore, and separated by a stratum of four inches of a gray sand containing very little iron. The three layers were traced with considerable regularity for one thousand feet along the shore. As we have seen, the sand from the beach at Bersimis contained but 34.3 per cent. of magnetic ore, and had a specific gravity of 2.81; the magnetic portion had, however, a specific gravity of 2.99, and the non-magnetic 2.77. The analyses of both of these will be found farther on.

A deposit of black sand, said to be equal in richness to that of Moisie, is described as stretching along the coast, nearly the whole distance from the Bay of Seven Islands to the mouth of the Moisie river. The sand from Mingan, which is mentioned above, and of which an analysis will be given farther on, is said to be from the west side of the St. John river, at Mingan, but is described as stretching from thence for a distance of three leagues along the coast, and as being very abundant. The deposits of sand at Natasquan and at Kagashka are also stated to be very extensive, and like Mingan, favorably situated for the loading of vessels.

An inspection of the iron sands from the various localities above mentioned, shows that they all contain, besides the ores of iron, a small proportion of red garnet, and more or less of fine silicious sand. The latter of the two substances it is possible to remove almost entirely by careful washing of the crude ore. The use of a magnet enables us to separate the black iron ore grains into a magnetic portion, which is nearly pure magnetic oxyd, and a non-magnetic portion, which is chiefly titanic iron, but, in the specimens submitted to examination, holds a portion of silicious matter, which the imperfectly washed sand still retains. In thus separating the ores into two portions for analysis, the magnetic grains were taken up by a magnet, the poles of which were covered by thin paper, and this process was repeated until the non-magnetic grains were, as far as possible, left behind. The two portions of the ore thus obtained were analyzed separately, the solvent used being, in both cases, hydrochloric acid, which, as is well known, dissolves magnetic oxyd of iron with great facility, and, with certain precautions, may be advantageously employed to dissolve titanic iron ore. For this purpose the non-magnetic portion, having been very finely powdered and sifted, is left to digest with about ten times its weight of hydrochloric acid of specific gravity 1.19, or thereabouts, for several hours, or until the undissolved residue is no longer black, but grayish or brownish in color. If the process has been conducted with care, and without over-heating, the whole of the iron, and all of the titanic acid which was combined with it, will be found in solution, and may be separated by the ordinary methods. The residue, apparently, contains little else than grains of quartz, with a small proportion of garnet. The finely pulverized ore may also be fused with bisulphate of soda, a process which is more expeditious, and yields equally good results with the last.

[TO BE CONTINUED.]

J. O. EHRENWERTH, in order to utilize pulverized coal or other fuel in blast furnaces, proposes to conduct the same, after sizing, by means of a peculiar apparatus, into the blast-pipe, close to the nozzles of the discharges. This would facilitate the regulation of the furnace; the formation of CO_2 about the tuyères takes place more rapidly, carbonic oxide is formed higher above the tuyères; the reduction zone is therefore placed higher up in the furnace, and the per centage of silicon in the pig-iron decreases.

MINING SUMMARY.

Pennsylvania.

THE PETROLEUM BUSINESS.

A correspondent of the New York *Evening Mail*, writing from a town in Armstrong County, thus reviews the petroleum business as it now exists. He says: "Few persons have much idea of the amount of business doing in petroleum, where it is mostly produced, and how gradually but successfully new territories have been developed. From the reckless speculations of wild and untried districts, upon which companies were formed with stupendous capitals, to which eager subscribers gave their money—resulting to the profit only of the projectors—the business has passed from a highly speculative one to that of extreme solidity. The science of geology has done much to regulate the stability of this branch of industry, and where its well defined laws has been followed as little risk has been presented in its pursuit as in any branch of ordinary trade. What better can a man have than a producing oil well, flowing or pumping anything over ten barrels a day, since it leaves him a clear gain of $40 or more a day. It is his bank credit where his drafts are always cashed. The cost of such a well, including engine, boiler and tubing, ranges from $4,000 to $7,000, according to the depth of boring. During the excitement of the first successful sinking of wells the best territory was confined about Oil City, Pit Hole and Cherry Run, but of late this has been extended down the Alleghany river as far as Brady's Bend. At Parker's Landing, some seven miles below Brady's Bend, a single well was sunk some five years ago, producing thirty-five barrels a day. To the general outside world little was known of or little attention was drawn to this well, until other wells have been put down, in number about two hundred, each one producing, and now the monthly shipments of oil from that place alone reaches some sixty thousand barrels. The peculiar formation at Brady's Bend renders this place the most attractive and promising one for large productions of oil yet known. Eminent geologists unanimously agree in the opinion that this place occupies the centre line of a great basin wherein lie vast bodies of petroleum. A flowing well has been struck here within the past month, ranging in its production from 250 to 500 barrels a day. There is no record of any well ever having produced so much without being tubed—the oil having flowed and so continued to prevent the tubing from being put in. Over 6,000 acres of this territory at Brady's Bend is in the hands of one company, formed some twenty years ago for the manufacture of railroad iron, and is still in successful operation. How strange it is that they now should find themselves in possession of such untold riches, little dreamed of by its projectors. Some seventy-five wells are now going down at this place, and before winter fairly sets in we may fully expect to hear that the great centre of the oil-producing business is fairly established at this place. Owing to the dip being in the direction of Brady's Bend, wells are sunk somewhat deeper than they are at Oil City; it is well known that oil found at a great depth is more lasting than when found in shallow wells. The total production of petroleum for the year 1869 of the Pennsylvania region is estimated at 3,816,956 barrels of forty-three gallons each. This would seem to overwhelm the market for all time, but the export for that year alone of refined and crude petroleum was 2,568,715 barrels, against an export in 1861 of only 37,500 barrels. A fortnight ago there cleared at Philadelphia for Europe seven ships, carrying 1,168,000 gallons of crude and refined oil. The fleets already chartered in New York and Philadelphia will take out of the country between this and the middle of July 10,000,000 gallons of refined oil. This exceeds by 3,000,000 gallons the export of the first seven months of any year since this oil became an article of commerce. While the production was increased the shipments abroad have also increased, so that either by accident or design the relation of supply and demand is regulated with an exactness which is not in the same degree manifest in any other commercial commodity. It has been introduced into every country as far east as India, and into every country dwelling and log cabin in our own States. Probably the most successful oil company which has been paying regular dividends is the Columbia Oil Company, having a territory, we believe, of two hundred acres, originally costing $30,000. They have regularly divided yearly dividends, ranging from $300,000 to $450,000. Oil dividends are made monthly, as this production being quickly converted into cash, with little to pay for labor, there is no necessity of retaining their money. In this way monthly dividends may be classed among the solid things. There are many private companies and individuals owning wells from which large sums of money are being realized, but we have no means of knowing about them. We do know that no branch of business presents such flattering returns for moderate investments as the sinking of wells in a territory known to be producing oil. The chances of success are fully equal to one in ten, which can rarely be said of any other business within our present knowledge."

Colorado.

MINING AT MONTEZUMA.

A CORRESPONDENT of the Georgetown *Miner*, writing of mining at Montezuma, under date June 12, says that the summer's work has hardly commenced. "JOHN T. LYNCH is about resuming operations with his mill upon his mine. That the business entrusted to Mr. LYNCH's management will prove successful is to assert what everybody knows. The Boston Silver Mining Company have run a tunnel which has cut into the Dowd lode at a depth of 150 feet from the surface. The quantity of ore on hand is large, and assays about $150 to the ton. The St. Lawrence Company have on the road hither a rotary stamp mill, which is to be erected in their new reduction works near Montezuma. This company intend to work the Napoleon and Sutro lodes, both very rich veins."

Nevada.

WHITE PINE REVIEW.

We condense the following review of mining affairs in White Pine from the *News:* The English Company, who have purchased the Eberhardt, etc., intend to import their labor from England, under contract wages far below the rates prevailing in this State. A large number of prospecting shafts are being sunk on the west side of Treasure City. As the base range commences on this ground, and many of the most valuable mines of mixed ores in the district are here, the labor will doubtless be amply repaid. The explorations are conducted principally by poor miners, who hire out occasionally to pay expenses. There is an unstamped deed in the Recorder's office transferring certain mines to an Eastern company. The amount stated in the deed is $500,000. The shipment of silver bars from Wells, Fargo & Co., for the week ending 13th, amounted to an aggregate of $43,340 84—$21,901 86 to San Francisco, and $21,438-98 to New York. Original Hidden Treasure never looked better. The decline in quotations is a "bearing" movement. The ore mills its usual average. Anchor Consolidated consists of the James Emma, Anchor and Treasure City, comprising in all 2,000 feet. The location is about the centre of Treasure Hill. In driving the tunnel they ran through 110 feet of solid quartz, assaying from $10 up to $150 per ton. In the centre of this immense body of ore is a shaft of 30 feet in depth, carrying ore all the way, of the same quality as that of the tunnel. Stanford mill is steadily running on ore from the South Aurora. Six men are at work on the Pennsylvania Body of ore, six feet wide. Silver Vault tunnel now in 180 feet; the last 10 feet through vein matter. Elko vein (base) averages five feet in width, nine tons, daily, of rich ore coming out. Silver Wave has struck good ore in its new shaft. Walsh furnace had an eight hours' run, when the foundation gave way, owing to having been laid on frozen ground. It will be repaired as soon as possible. Twenty-one bars were moulded during the run. The Big Smoky mill is running night and day. The Welland furnace is running on ores from the Elko mine. The Rathburn furnace will fire up in a few days. A rich strike of chloride in the Conover mine, on Babylon hill is reported. Fifty pounds assayed $3,000 or $4,000 to the ton. Fifty tons Bromide Tunnel ore worked $40 per ton at Moyle's mill.

OUTSIDE DISTRICTS.—Some three weeks since, Judge Goodwin, who is running the Wilson furnace at Eureka, on ore from the Jackson mine, bonded the mine for $5,000, and in less than twenty days' run paid the purchase price from the bullion extracted from the ore. The Germania, gold-bearing mine, at Pinto, has five tons of selected ore on the dump. Assays have gone from $1,500 to $12,000. Assays from the Champion run from $400 to $768 80. The poorest ore from the Mountain Chief, on Silverado Hill, assays $138 21. James McNevin has a mine in Pinto called the Maryland. The ledge is 30 feet wide, and a sample of a two-foot stratum assays $1,360 60 to the ton. Miners' meeting in Pinto, on June 1st, made two days' work necessary to hold each 200 feet for one year.

THE COMSTOCK.

In reviewing the mining share market, the San Francisco *Commercial Herald*, June 24, says: The mining share market has not been characterized by any great degree of activity during the week under review, the sales aggregating far less in amount than the previous week, the bulk of transactions being confined to half a dozen stocks, which have for some weeks changed hands to a very large extent. Prices have been well maintained under the present rather anomalous condition of the market, but the market shows no disposition for a general upward movement. The sale of large mining interests in White Pine seems to promise more active operations in that region in the future. This capital, which is brought into the country by Englishmen, will have a recuperative effect to no small extent. We also clip the following from the Alpine *Miner:* "The sale of 2,143 shares in the Sierra Buttes mine, at $250 per share, to English capitalists, implies that the total value of the mine is $750,000. The transaction is generally considered a safe one for the purchasers, and not unprofitable for the Reis Brothers, who have sold out after drawing heavy dividends from the mine for three years." The Sutro tunnel seems to make steady progress. It is now in 1,250 feet. At a distance of 1,217 feet, they encountered "casings" four feet thick, since which time they have been running in blue clay, and are now obliged to timber as they go along. No one can estimate the effect upon mining interests generally in Virginia City, should this work lead to any reasonable developments.

CHOLLAR-POTOSI.—During the week ending June 17th, they extracted 1,333 tons of ore, being an excess of 103 tons as compared with the previous week, and showing an average assay value of $67 75 per ton. We learn of no change in the Blue Wing section of this mine, while the Belvidere section has widened to the extent of one set of timbers, making the stopes at the widest point 32 feet. In this locality more waste is mixed with the ore than was visible in the faces a week ago. To the west drift, from the raise in the new shaft, 42 feet have been added, the last ten feet having been driven through quartz, with spots of metal-bearing quartz, but not sufficient to make it fit for milling. On the 17th inst., $45,154 in bullion was dispatched to the office in this city. For the month of May the bullion receipts amounted to $146,984. The daily ore slip of June 20th shows that they sent 183½ tons of ore to four different reduction mills.

HALE AND NORCROSS.—The following amount of ore was extracted during the week ending June 18th; 175 level, 228½ tons; 300 level, 436; 535 level, 160; seventh station level, 891½—total, 1,716 tons. At present they are engaged in sinking a winze below the seventh station, at a point twenty feet north of the shaft. It is now down but a short distance, and the ore encountered is reported to be of good quality. The north drift exhibits no change since our previous report, while the ore-breasts on this level continue to look well.

GOULD AND CURRY.—For the week ending June 18, 497¼ tons of ore were extracted, showing an average assay value of $50 10 per ton; previous week, they took out 546 tons. During the week under notice, prospecting in all directions has been vigorously prosecuted, without any favorable results. The general appearance of the El Dorado stopes is not as promising as at the close of the preceding week.

BELCHER.—During the week ending June 20, 371 tons of ore were sent to the Rhode Island Mill, showing an average assay value of $47 24 per ton. The drift running north, 21 feet above the 152-level, has improved in quality within the past few days, and they are now preparing to stope it out. In the drifts 65 feet above the 262-level, the ore continues in small seams. On the 730-level, the cross-cut east has encountered some water, but no change is noticeable in the rock.

KENTUCK.—The report for the week ending June 17th states that they extracted 196½ tons of ore, valued at $3,215 33, equal to $16 40 per ton.

CROWN POINT.—For the week ending June 17th, 318 tons were taken out, showing an assay yield of $4,809 93, or $15 12 per ton.

IMPERIAL.—On the 20th inst. the bottom of the winze showed quartz and porphyry; it now has attained a depth of 110 feet. The face of the 1,200-level drift is in porphyry and quartz. The drift running south on the 1,100-level is in barren quartz.

BULLION.—The following is a telegraphic despatch: "Virginia, June 22d. An assessment of $5 per share was levied yesterday on the Bullion Mining Company, payable immediately." At a meeting of this Company, held June 21st, the Board of Trustees decided to increase the Capital stock from $1,000,000 to $2,000,000, or from 2,500 shares at $400 per share, to 5,000 shares at $400 per share.

OPHIR.—The report dated June 21st reads: "At shaft No. 1, the water is 30 feet in depth. Both tanks and pump are running. Work

at shaft No. 3 is prospering well, without making any favorable developement."

SIERRA NEVADA—shipped $6,000 in gold bullion on the 16th inst.

OCCIDENTAL MILL AND MINING COMPANY.—The Stockholders are invited to call at the office of J. E. B. Cavallier and register the same, with a view of re-organizing the company under the laws of California. The sale of the stock for delinquent assessment was deferred until July 2d.

ALPHA.—Following are the Trustees elected for the ensuing year: J. D. Fry, Thomas Sunderland, Louis Gerstle, William Sharon, and A. K. P. Harmon.

HIDDEN TREASURE (White Pine) elected the following Trustees: B. F. Sherwood, F. G. Smith, E. F. Child, L. Linkton, and William F. King.

YELLOW JACKET.—The annual meeting takes place at Gold Hill on the 18th of July instant.

SPECIAL SCIENTIFIC BREVITIES.

THE FOLLOWING is a method given by M. WEISSKOPF, of producing upon iron a durable black shining varnish: "Take oil of turpentine, add to it, drop by drop, and while stirring, strong sulphuric acid, until a syrupy precipitate is quite formed, and no more of it is produced on further addition of a drop of acid. The liquid is now repeatedly washed with water, every time refreshed after a good stirring, until the water does not exhibit any more acid reaction on being tested with blue litmus paper. The precipitate is next brought upon a cloth filter, and, after all the water has run off, the syrupy mass is fit for use. This thickish magma is painted over the iron with a brush; if it happens to be too stiff, it is previously diluted with some oil of turpentine. Immediately after the iron has been so painted, the paint is burnt in by a gentle heat, after cooling, the black surface is rubbed over with a piece of woollen stuff dipped in, and moistened with linseed oil. According to the author, this varnish is not a simple covering of the surface, but it is chemically combined with the metal, and does not, therefore, wear off or peel off, as other paints or varnishes do from iron."

WE regret to learn that with this month the "American Reprint of the *Chemical News*," and consequently also the American supplement, edited by Prof. C. F. CHANDLER, will cease to appear. We are indebted to that excellent journal for many valuable extracts, and notice that its suspension is due to causes entirely apart from its intrinsic merits. At the same time we are informed that Prof. CHANDLER, who is one of the most distinguished chemists in the country, will immediately commence the publication of a new paper, based on the plan of the *Chemical News*, to the appearance of which we look forward with great interest and anticipations of complete success.—*Industrial Review.*

DR. W. FLIGHT, of London, found as early as 1868 that the composition of an old Bactric coin, bearing date of 200 years B. C., is almost identical with that of the present Belgian five and ten centimes pieces. This is corroborated by later investigations. According to a communication to the Numismatical Society of London the above coin showed the following contents: Copper, 77.58; nickel, 20.04; cobalt, 0.51; iron, 1.05; tin, 0.04; silver, trace sulphur, 0.09. The Belgian five and ten centimes pieces are by law intended to contain 75 per cent. of copper and 25 per cent. nickel. Dr. Flight has, at a later date, received two more Bactric coins of similar composition, but without a trace of silver.

WETZLAR EMPLOYS for the coating of iron with copper, when the copper is intended to serve as mediator for affixing gold amalgam, a solution of oxalate of copper and ammonia, instead of the common blue-vitrol. Both the iron and the solution must be slightly heated before the application. WETZLAR claims that no other copper solution deposits a coating as beautifully lustrous, smooth and dense, and which is so little inclined to lose its metallic lustre and bright red color after taking it out of the bath. The above double salt is prepared by WETZLAR by saturating a solution of carbonate of ammonia with oxalate of copper, which is insoluble in water.

BY DIGESTING metallic zinc in iodide of ethyl, we obtain a volatile liquid which takes fire spontaneously in the air, and is known to chemists under the name of "zinc-ethyl." It can be distilled in an atmosphere of hydrogen, and if this gas be made to pass through the liquid, it will carry off some of the zinc-ethyl, and when ignited will burn with a magnificent white flame. It is probable that ordinary illuminating gas would answer as well as hydrogen for this experiment. The light produced in this way can be employed to take photographs, but its actinic properties are not equal to the effects produced by burning magnesium.

M. MAGNES LAHENS suggests a method of preparing Tar-water, which is more expeditious and convenient than the plan commonly followed. He mixes the tar with sand, previously washed and dried, throws the mixture into a percolator, and shakes the instrument gently to secure proper adjustment of the mixture. Water is then poured on, the first part of the filtrate is rejected, and the latter portion is kept for use. He uses one-half ounce tar, twenty-six ounces of sand, to obtain two pints of the medicated water, which corresponds in strength with that of the codex.

M. CLOEZ purifies bisulphide of carbon by leaving it twenty-four hours in contact with powdered corrosive sublimate. The mixture requires agitation. It is then carefully decanted and distilled from a little inodorous fat with the aid of a water-bath. The sulphide, when purified in this manner, has an ethereal odor, and is suitable for the extraction of odorous oils, etc.

A GERMAN archæologist engaged in exploring the extensive plain on the coast of Asia Minor, believed to have been the site of ancient Troy, claims to have discovered the remains of a massive wall, about eight feet thick. The excavations are extensive, and the explorer says that the ruins are the remains of the Palace of Priam.

THE VALUE of glue, that is, the amount of pure gelatine it may contain, may be determined by precipitating this body with pernitrate of mercury, a standard solution of which tested with a known weight of pure gelatine may be employed.

THE AGES of three celebrated botanists who died last year are remarkable. Prof. Bertolini, the Sedgwick of Bologna, was ninety-three; Prof. Moris, of Turin, seventy-three, and Prof. Purkinje, of Prague, was eighty-two.

M. BERT has been making experiments with regard to the action of green light on the sensitive plant. In a few days this light has the effect of darkness, the plant ceases to be sensitive, and finally dies.

M. LENORMANT read a paper at the Academie des Sciences, recently, in favor of a theory, based upon philological data, that the horse is of Asiatic and the ass of African origin.

THE UNIVERSITY of Vienna has decided to open its medical lectures to, and confer medical diplomas on women.

ON DIT ABOUT MINES AND METALS.

MR. H. CARON, in a paper on the "Cause of the 'Rochagé' of the Carburets of Iron, and on the sparks produced by these Metals," understands, by *rochage*, a peculiar production of sparks, best seen when molten cast-iron is run off from the blast furnace into moulds. In this long paper, the author describes a series of experiments undertaken with the view to prove that, since steel and cast-iron, when molten in an atmosphere of hydrogen or oxide of carbon, never emit sparks, the production of the latter cannot be due to an evolution of reducing gas absorded during the fusion, but is due, according to the author, to the formation of oxide of iron at the moment the molten metal comes in contact with air. When iron is kept fused in an atmosphere of hydrogen, its specific gravity increases from 7.84 to 7.88, while the metal becomes as soft and malleable as copper. When cast-iron is kept fused for a long time in a crucible, it absorbs oxygen, becomes lamellar, and on cooling, contracts so suddenly as often to leave the inside of the mass hollow.

S. MEUNIER, describes the Meteorite from Saint-Denis-Westrem, near Ghent, as follows: "This stone, weighing 720 grms., which fell from the sky on the 7th of June, 1855, the fall being accompanied by a loud detonation and strong emission of light, belongs, according to the author, to what he terms *luceite*, a white-colored, fine-grained harshly-feeling, very crystalline substance (specific gravity, 3.43) consisting for 88.9 per cent. of a lithoid matter, made up of silica, magnesia, oxide of iron, alumina, soda and potassa, with traces of lime and oxide of chromium. Fully 65 per cent. of this quantity is soluble in chlorhydric acid. By means of the magnet, about 8 per cent. of metal, chiefly iron, is separated. The paper contains an exhaustive discussion on the origin of meteorites; and the author states that our moon is gradually tending more and more to become broken up into smaller spheroids, some of which may reach our globe as meteoric stones at a future day."

THE IMPORTANCE of the iron manufactories at Cleveland may be judged from the following statistics recently published: During 1869, 12,765 tons of pig iron were made there; 30,000 tons of railroad iron; 16,000 tons of merchant iron; 4,000 of boiler, tank and sheet iron; 4,450 of forgings; 7,100 of nuts, washers, bolts, nails and spikes, and 18,300 in machinery castings. The consumption of pig and scrap-iron amounted to 67,500 tons; that of coal and coke about 230,000 tons. Cleveland has 14 rolling-mills, with 200 puddling-furnaces, and a daily capacity of 400 tons of finished iron. There are 5 stove foundries, 1 malleable iron works, 1 axe and tool company, 6 boiler-plate and sheet-iron works of large capacity, 3 foundries for making car-wheels and castings for buildings, 1 large manufactory for cross-cut, circular and other saws. Five thousand stoves, with the accompanying hollow-ware, were made in 1849.

THREE STETEFELDT furnaces have recently been constructed at the Union Foundry, in San Francisco, one each for the following localities: Monte Christo, White Pine; Mineral Hill, near Elko, and a third for the Manhattan mill at Austin. The first of these improved furnaces, it will be recollected, was put in operation at Reno, where it has given the highest satisfaction, and has led to the subsequent orders as above. In addition to the furnace above mentioned as having been shipped to Mineral Hill, the Union Foundry has also recently forwarded to the same locality a quartz mill complete, with engine, stamps, etc.

THEY ARE making puddled steel at Allentown, Pa., which stood a tensile strain of 127,320 pounds on the square inch. A piece of steel-capped rail made by this process was lately tested at the Camden and Amboy Company's shop, at Lambertville, New Jersey. It stood 5,500 blows, and the weld still remained perfect, thus demonstrating that it is peculiarly adapted to make the perfect rail. This rail can be re-worked, while the Bessemer rail can not. This steel, at this experiment, stood 500 more blows than the best Bessemer steel rail stood at the same works.

THE INCREASED demand for bismuth has occasioned the examination of new localities, and the search has, in several instances, been attended with success. A remarkably pure ore has been found in Peru, which, on analysis, gave: bismuth, 93.372; antimony (with traces of tin), 4.570; copper (with a little iron), 2.058—total, 100. The absence of arsenic and sulphur is noteworthy, and distinguishes this ore from the Saxon variety. Also, in South Australia, seams of bismuth have been found associated with copper.

THE ROSE Bridge Colliery at Wigan, Lancashire, England, is 2,424 feet, or nearly half a mile deep. The increase of temperature in going down through the strata is said to have been about 1° Fahr. for every 51½ feet. At the bottom of the mine, the temperature is 79° Fahr. in the open pit and 93½° in the solid strata. There is plenty of coal reported much deeper, but it is an open question whether it will pay to mine it.

JOHN A. GRISWOLD & COMPANY, proprietors of the Bessemer Steel Works, of Troy, N. Y., made about 2,000 tons of steel rails, half of them for the Erie Railroad, prior to the burning of the works, in October, 1869. None of these rails have broken, and official certificates testify that they are equal to the best foreign rails. The new works, now nearly completed, will enable the proprietors to produce steel rails at the rate of 15,000 to 20,000 tons per year.

IT is estimated that 1,900,000 persons are employed in manufacturing establishments in the United States, and that the number supported thereby is 10,000,000. Of this number, 640,0 0 are employed in the manufacture of iron, steel, and in mining ore and coal. The amount of capital employed in the manufacture of iron and steel is $420,000,000.

AT AULNOYE, in Belgium, a profitable use has been found for the slag from the large ironworks there established. It is cast into slabs for pavement and paving purposes generally; into garden rollers and posts and pillars; and in some of its forms is described as artificial porphyry.

THE WHITE PINE *News* is informed that the English company who have purchased the Eberhardt, intend to import their labor from England, under contract wages far below the rates prevailing in this State.

A COMPANY with a capital of $100,000 has been incorporated in Jackson county, Oregon, to construct ditches from Applegate creek to Jacksonville, for mining, manufacturing and irrigating purposes.

THE PENNSYLVANIA STEEL WORKS, at Harrisburgh, Pa., produce some 13,000 tons per annum, principally for the Pennsylvania Railroad Company.

A NEW SALT has been discovered in the salt-pits of Hallstadt, which M. Tschermark, of Vienna, has named Simonyite, after its discoverer.

THE PEACE RIVER MINES seem to have turned out a humbug, and the letters from that region do not speak favorably of mining matters.

MISCELLANEA.

THE recent destruction by fire of the bridge of the Pittsburgh, Cincinnati and St. Louis Railroad, over the White River, at Richmond, Ind., suspended all traffic on the road, and it became a necessity to reconstruct the bridge in the shortest possible time. The efforts put forth succeeded in accomplishing the quickest feat in bridge-building on record. The structure consisted of three spans, each one hundred and eighty-five feet long, making a total width of five hundred and fifty-five feet, and the height of the rails over the water was seventy-four feet. No less than three hundred and twenty thousand feet of lumber were required, and so prompt were the managers of the undertaking that on Saturday and Sunday seventy-four cars were despatched from this city to the scene of operations, with lumber. Then two hundred and twenty-five men went to work immediately, and so quickly was the material put together that on Sunday afternoon trains passed over the bridge, and traffic on the road was resumed. This was the most rapid and complete piece of work of the kind ever done anywhere.

THE American tube well, which has met with so much favor abroad, especially in the Abyssinian expedition, has received some modifications at the hands of foreign inventors. Among the latest of these is that devised by a Mr. CLARK, of Cheapside, London, and which he describes as consisting in forming the bottom end of a tube well open instead of closed, and in fitting into the bottom and open end of that tube, which first enters the ground, a solid or hollow conical steel or iron plug, the upper part of which, for about two feet, is formed cylindrical, so as to fit easily within the tube, but perfectly close in the lower end thereof, to prevent *debris* passing up the tube between the aforesaid plug. The aforesaid plug, which is about six feet long, is formed tapering downwards from its greatest diameter to a sharp point, and to this plug he connects rods as the sinking of the tube progresses.

THE Texas Pacific Railroad has passed the Senate. FREMONT and ROSECRANS are among the incorporators. The line chartered is from Marshall, Texas, to San Diego, Cal. Texas gives lands to aid construction from Marshall to El Paso; through New Mexico and Arizona the grant is forty sections, and through California twenty sections per mile. The connection at this end, with Fulton, Ark., to Dallas, Texas, gets a land grant; also the one from Marshall *via* Shreveport, Alexandria, and Baton Rouge to New Orleans. The connection from Vicksburg to Shreveport gets no additional grant. The connections authorized in California get twenty sections per mile. All rails used, not already contracted for, are to be of American iron or steel. One good feature is that the road shall be completed within ten years, and another is that the land shall be sold at $2 50 per acre. Fixing the guage at 4½ inches wider than that already in use upon three-fourths of the railroads in the United States is deemed however a great mistake.

THE laquer tree of Japan is now being introduced in California. A Japanese student living here, Mr. KENDO, has published a book of instructions for raising tea and silk. He speaks of the laquer tree as adapted to this country. Like the ailanthus, the male and female are separate trees. It is only the female tree that yields the laquer, after the fashion of turpentine trees. Both sexes produce seed, about fifty pounds each. They are berries coated with wax. This wax berry separated answers the purpose of beeswax. It is an article of extensive commerce. The laquer of Japan has wide celebrity. On the third year from the seed they begin to tap the tree and gather the wax. The tree resembles the walnut. It grows twenty-five feet high and eighteen inches in diameter. The process of gathering the laquer and of cleaning the wax involves little labor or skill.

J. C. CHICHESTER, of New York city, says in a letter to the *Gas Light Journal*, that a workman at a Gas Works where he was in charge had a little "unpleasantness" with a large and valuable dog, during which the dog was killed. As the animal was highly prized by the owner trouble was anticipated, and the question arose as to what would be the best way to dispose of the carcass, when it was decided to put it in a retort and *make gas of it*. It was put into one that had been in use for some time, and contained considerable carbon; the result was that when the *dog* was drawn out nearly all the carbon came with it. The retort was nearly as clean as when put in new. When the gas was tested at the burner it was much improved. Since that time all the dead dogs and cats in that vicinity find their way into the retort. It is no unusual thing to see a workman dragging one along after him as he goes to work.

THE Missouri, Fort Scott and Gulf Railroad is thus spoken of by the Lawrence *Journal*: "The equipments of the road are of the most durable and substantial character. It is being stone-ballasted, and there is no excuse for not having a continuous line of stone-ballasted road from Kansas City to Baxter, as the rock is found immediately along the entire line; and the great capitalists at the back of the enterprise have plenty of 'rocks' to stone-ballast a road from the lakes to the gulf. The depots are all first-class, the road-bed is in excellent condition, and the rolling stock is of the best class. The entire line, from Kansas City to Baxter Springs, 165 miles, passes through a rich country, that cannot fail, ultimately, to afford a splendid local business for the road."

THE people along the Cumberland river think it has been neglected by Congress, and that in justice it should have an appropriation for improving its navigation. Not a dollar has been expended upon it since 1838, and it has never had above $155,000, all told. It is navigable for 500 miles. Some of the products of the Cumberland valley are iron, coal, salt, gypsum and lead. The coal is very similar to that found at Pittsburgh, and is in great abundance. The crops are cotton, tobacco, corn, etc.

A MEASUREMENT of the Hoosac tunnel excavations has just been made, showing on the eastern end 31 feet advance in a week, and that the whole length is 7,043. The central shaft, which is in process of sinking, is now 336 feet deep, leaving 94 feet to be accomplished to reach the grade of the tunnel. From the west end the tunnel was advanced 25 feet in one week, making it 4,902 feet long. The brick arch which fell some time ago, owing to a slide, has been rebuilt.

THE fare on the railroad between New York and San Francisco has been reduced to $130.

A NEW gold mine has been discovered near Jalapa.

BUSINESS AND PERSONAL.

[Short notices in this column fifty cents per line each insertion.]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf.

MARKET REVIEW.

The Coal Trade.

NEW YORK, July 8, 1870.

WHOLESALE.—In consequence of the many rumors pervading the market—first in regard to the strike on the eight hour law, secondly in regard to a new bill of lading which the so-called Vessel Owners' Association seek to force upon the trade, and finally relative to the rescinding of drawbacks by the President of the Philadelphia and Reading R. R.—prices have advanced some 25 cents per ton, and there is a general tendency in the market by those who have coal to hold on to what they have until the difficulties are in some way definitely settled. Our readers will now see the propriety of paying some attention to our remarks relative to the best time to buy coal, which we placed before them three or four weeks ago; and many are no doubt now sorry that they did not take our advice. These troubles that now threaten us are just the ones we held up to the buying public as most likely to take place and obstruct the free course of the trade.

The question on the eight-hour law is the same one raised last March and voted down by the Hyde Park miners. It has again been submitted by the W. B. Association to the men, and the vote is to be taken on the 15th inst. Pending the result, the market is, of course, speculative. We don't think the eight-hour law can ever be enforced in coal mining, inasmuch as there is such an immense continual expense going on in a mine, such as the retinue of yearly salaried officers and clerks, the continual running of the necessary machinery for working the mine, and the care and feeding of the mules, etc., etc., which expenses cannot be curtailed. Most of the laborers and actual miners of coal in the mines do not now work over six or eight hours a day, but inasmuch as they are mostly paid for the amount of labor performed, or by the car, it makes no difference what the law is. It is not so much the desire that the law should be justly enforced as to get up a general stoppage, in order to help Schuylkill out of her present difficulty by forcing up the price of coal. We think the men of the large companies will vote against the measure, and the whole thing will end in a fizzle, as it did last March.

The following are the resolutions referred to above:

"*Resolved*, That on and after the 15th day of July, eight hours shall constitute a lawful day's work for all members of this Association in the Anthracite coal-field.

Resolved, That each branch and district shall regulate their average contract work not to go over 8 per day on basis of 1869, with the privilege of twenty-five cents per day for gangways and wet and dangerous places.

"*Resolved*, That those places who have not yet the basis be restricted to one-fifth their labor, with one exception—those working on the Carbondale regulations; but the eight hours to be enforced without distinction in all the districts."

The following is the circular of the Vessel Owners' Association, addressed to the New York Coal Shippers, on Tuesday last, July 5th:

MEETING OF VESSEL OWNERS.

A Circular in Regard to the Transportation of Coal.

A meeting of the owners of vessels was held yesterday, and the following circular adopted.

To the Shippers of Coal from Roundout, Newburgh, Hoboken, Port Johnson, Elizabethport and South Amboy:

GENTLEMEN: For several years past serious delays have been experienced by the vessels engaged in the Coa Trade, in awaiting turns to unload their cargoes. These delays are often occasioned by the consignees' lack of facilities for promptly receiving the cargoes, and in other cases are caused by the practice of some of the larger purchasers of ordering their coal shipped as rapidly as possible, for the purpose of availing themselves of a favorable current rate of freight, but without paying sufficient regard to the accumulation of vessels at their wharves resulting from such a course. It is often the case that captains of vessels thus detained, see other vessels go from the port and return again while they have been lying idle with crews on pay, exhausting their stores, awaiting their turn to unload. As a consequence of such delay, it is found that a great many of the vessels engaged exclusively in freighting coal spend more time in port than out, and yet receive no compensation for the detention. And this serious obstacle in the way of a profitable coal-carrying trade has seemed to increase with the growing magnitude of the trade itself, making necessary some provision against the evil, or some compensation to vessels for it.

About a year ago, the Vessel Owners' and Captains' Associations of Philadelphia, New York, New London and Boston, representing a large amount of tonnage, adopted for use at Baltimore, Philadelphia, Alexandria and Georgetown, a bill of lading for coal, containing the following protective demurrage clause: "And twenty-four hours after the arrival at the above named port and notice thereof to the consignee named, there shall be allowed for receiving said cargo at the rate of one day, Sundays and legal holidays excepted, for every hundred tons thereof; after which the cargo, consignee or assignee shall pay demurrage at the rate of eight cents per ton a day. Sundays and legal holidays not excepted, upon the full amount of cargo, as per this bill of lading, for each and every day's detention, and pro rata for parts and portions of a day beyond the days above specified, until the cargo is fully discharged; which freight and demurrage shall constitute a lien upon said cargo."

With but few exceptions, this bill of lading which, since its adoption, has been in constant use at these ports of shipment, has given general satisfaction. Many of the prominent eastern purchasers have approved it as a just and reasonable guarantee against uncompensated detention, and some see foreshadowed in its general use many advantages; these are enumerated in the circular.

The 6th of July is fixed as a day for introducing the new bill of lading in this section, and we trust that it will not be met with disfavor on your part, but that you will see the propriety of its introduction and adoption as being advantageous to the shipper, the purchaser and the freighter of coal, all of whose interests are in a great measure identical.

The above circular has met with general opposition from the trade, and justly so. We are now altogether too much trammeled with "laws and regulations" regarding the shipping of coal, and any new idea that endangers the freedom of the trade, we naturally oppose. The masters of vessels have sufficient protection now in the laws of the States relative to the subject, and their greed of gain only leads them to this new instance of impudence. Philadelphia has been encumbered with a similar bill of lading during the past year, and the consequence is that dealers who can find coal anywhere else, won't go there after it. As far as we have been able to learn, all the leading dealers in this market hoot it down, and they positively refuse to do business with any person in any wise connected with the measure.

In view of the issuing of the resolutions of the W. B. Association, in regard to the eight-hour system, and for the purpose of defeating their adoption in the Schuylkill region, the Reading railroad withdraws the drawbacks announced some weeks since. These drawbacks were made in order to allow the miners to resume operations under the $2 50 basis, offered by the Schuylkill operators. These drawbacks amount to some eighty cents. The railroad has also advanced tolls fifty cents, making a total of $1 30—both to take effect to-day, the 8th instant. The President announces, in connection with this notice, that the drawbacks will be again allowed, and the freight rescinded, when the entire regions shall have resumed operations peaceably.

We have before us another circular from the Anthracite Board of Trade, setting forth the many grievances of the operations in the Schuylkill District, and again urging the operators not to give way to the miners in their demands for the basis of 1869. The document is a repetition of what we have already published on this subject.

PRICES.—While the quotations in this week's JOURNAL are the acknowledged prices of the various parties credited with them, a few floating lots are being disposed of at an advance of twenty-five cents and the market has a firmer feeling generally. Business has been very lively during the past week.

The Wilkesbarre Coal and Iron Company's coals are meeting with general favor among dealers and consumers, and their sales this year will probably double those of last. Great care is taken in the preparation of these coals, and we frankly recommend them to retailers generally throughout this State and the East. The manner in which the business of this company is transacted is also an inducement for dealers to patronize them; all parties can be assured of honorable dealing and the prompt delivery of their contracts. Mr. TILLINGHAST, the genial Treasurer of the Company, has returned from a Continental tour to his old post, and will be happy to see old friends.

FREIGHTS.—Vessels are in good demand, and are readily taken at our quotations; rates are firm, and we hear of slight advances being paid in some cases.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending July 2, 1870, compared with week ending July 3, 1869.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila. & Reading R.R	97,797	1,446,443	44,327	1,136,142
Schuylkill Canal	37,923	232,593	2,548	45,133
Lehigh Valley R. R.	38,396	1,013,780	60,084	1,611,332
Lehigh & Sus. R. R.	15,001	327,938	23,209	494,936
Lehigh Canal	8,970	185,675	27,969	204,404
Scranton North	701	207,056	17,625	533,984
" South	3,159	598,170	35,406	896,045
Penn. Coal Co., rail	24,830	489,809	24,996	658,242
" " canal	476	7,127	594	7,406
Del. & Hud. Canal Co.	22,119	530,018	49,244	647,059
" " R. R.	127	98,431	4,232	239,463
" " south	...	48,853	12,466	218,207
Shamokin	9,208	158,586	9,092	164,713
Trevorton	329	7,493	2,117	42,240
Lykens Valley Coal Co.	2,069	29,686	3,132	42,062
Wyoming South	4,759	62,387	2,320	110,562
P. N. Y. C. & R. R. Co.	...	...	7,780	149,435
Williamstown, Col'y	...	72,658	...	...
Short Mountain	...	46,552	...	...
Total	263,910	5,543,265	329,048	6,902,355
1869	...	...	283,910	5,543,265
Increase week and year	...	...	65,138	1,359,090

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending July 2, 1870, compared with week ending July 3, 1869.

COMPANIES.	1869. Week.	1869. Year.	1870. Week.	1870. Year.
& O. R. R.	....	....	....	....
C. & O. Canal	....	....	....	....
H. & B. T. R. R.	2,565	174,454	7,206	185,991
Harrisburg & D.	....	....	16,259	391,631
L. V. R. R.	....	552	....	8,229
P. & N.Y. C. & R. Co.	....	....	5,612	118,662
	....	....	....	....

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending July 2, 1870—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1870. tons ct.	WEEK, 1869. tons ct.	YEAR 1870. tons cwt.	YEAR, 1869. tons cwt.
Wyoming Region	34,33 12	20630 14	572318 01	291867 02
Upper Lehigh Region	4283 12	500 16	65481 16	57078 15
Mahanoy Region	94 07	96 12	475 04	914 13
Hazleton Region	12354 00	132 01	102183 14	52838 15
Beaver Meadow Region	610 14	1540 14	47700 10	26462 09
Mauch Chunk Region	97 14	22 11	30187 12	119079 01
Totals	57233 19	22923 08	818346 17	548420 15
Increase	34310 11		269926 02	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	23200 11	15001 00	494938 05	327938 12
Forwarded East of Mch Chunk by Canal	27969 12	6970 13	234404 03	185675 04
Delivered at and above Mauch Chunk	847 05	900 15	20212 09	15967 10
Delivered to L. & B. R. R. at Plymouth Bridge	5207 07	51 00	98735 09	13698 03
L. V. R. R. at Sugar N.				5161 03
Totals	57233 19	22923 08	818346 17	548420 15
Of the above there was from Mines controlled by Co., W.B.C. & L.Co	17567 18	14460 11	251007 14	152251 06
L. C. & N. Co	97 14	22 11	46841 03	132591 08
Totals.	17665 12	14483 02	297849 03	284842 14
Increase	3182 10		13006 09	
Decrease				

Schuylkill Coal Trade.

Report of Coal transported via the P. and R. R. for the week ending June 30, 1870—less coal carried for Company's use, and Bituminous Coal:

For week	44,237 03
Previously this year	1,091,904 19
Total	1,136,142 02
Same time last year	1,446,443 00
Decrease	310,300 18
Amount sent same week 1869	87,797 09

Amount of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, June 30, 1870:

From St. Clair	11,738 19
" Port Carbon	3,514 15
" Pottsville	693 10
" Schuylkill Haven	19,180 04
" Auburn	1,607 05
" Norristown	...
" Port Clinton	3,793 10
" Allentown and Alburtis	3,679 00
" Harrisburgh and Dauphin	16,259 02
Total paying freight	60,496 05
Coal for Company's use	1,791 19
Total for week	62,291 04
Previously this year	1,472,378 16
Total	1,534,670 00
To same time last year	1,685,254 19

Report of coal transported over the Schuylkill Canal for the week ending Thursday, June 30, 1870.

	Tons. Cwt.
From Port Carbon	128 00
" Pottsville	132 00
" Schuylkill Haven	2,185 05
" Port Clinton	103 00
Total for week	2,548 05
Previously this year	42,582 04
Total	45,130 09
To same time last year	232,593 15

Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending June 30, 1870:

	Tons.
For week	16,259 02
Previously this year	375,372 10
Total	391,631 12

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company, for week ending Saturday, July 2, 1870.

	WEEK.	SEASON.
North	46,748 17	1,143,187 02
South	12,466 06	218,207 00
Total	59,215 03	1,361,394 02
Corresponding time in 1869.		
North	3,062 02	707,834 06
South	161 10	47,297 09
Total	3,223 12	755,131 15
Increase North	43,686 15	Increase 435,352 16
Increase South	12,304 16	Increase 170,909 11
Total Increase	55,991 11	Increase 606,262 07

Report of Coal Transported over Lehigh Valley Railroad

For the week ending July 2, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREV'LY. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	13,704 14	343,817 04	357,521 18
" Hazleton	47,442 19	1,040,630 05	1,078,073 04
" Upper Lehigh	442 11	6,923 01	7,365 12
" Beaver Meadow	22,274 03	356,526 15	378,800 18
" Mahanoy	3,772 05	122,143 08	125,914 13
" Mauch Chunk	...	447 17	447 17
Total Anthracite	87,635 12	1,860,488 10	1,948,124 02
Bituminous Coal rec'd from Cata. R. R.			
N. C. R. R.			
E. P. R. R.		8,229 00	8,229 00
P. & N.Y. C. & R.R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	87,635 12	1,868,717 10	1,956,353 02
Same time last year	38,805 02	1,098,509 03	1,137,314 05
Increase	48,830 10	770,208 07	819,038 17
Decrease			
Forwarded East from M'h Chunk by rail	60,084 02	1,551,248 03	1,611,332 05
Same time last year	36,396 13	977,394 03	1,013,790 16
Increase	23,697 09	573,854 00	597,551 09
Decrease			

RECAPITULATION.

Forwarded East from M'h Chunk by rail	60,084 02	1,551,248 03	1,611,332 05
To N. C. R., at Mount Carmel		115 00	115 00
Forwarded North from L. & B. Junction	7,786 15	141,229 02	149,009 17
To L. & S. R. R. at Packerton for rail	130 06	4,095 11	4,225 17
Delivered at M'h Chunk	5 01	690 02	695 03
Delivered on line of road above Mauch Chunk	140 16	7,058 04	7,199 00
Delivered above M. Chunk for use of L. V. R.R.	1,313 01	29,026 15	30,339 16
To L. & S. R. R., at P'n Hav., for railroad	12,174 19	85,455 07	97,630 06
Do. for canal	6,006 10	41,570 06	47,576 16
At M.Chunk for canal			
Total Anthracite	87,635 12	1,860,488 10	1,948,124 02
Bituminous Coal		8,229 00	8,229 00
Total all kinds	87,635 12	1,868,717 10	1,956,353 02

Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via the Pennsylvania and New York Canal and Railroad Company, for week ending July 2, 1870:

	WEEK.	PREVIOUSLY.	TOTAL.
Anthracite	7,780 15	....	149,435 16
Bituminous	5,612 00	....	118,662 00
Total, Ant. and Bit.	13,392 15	....	268,097 16

Prices of Coal by the Cargo,

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK, July 8. R. A.	W. A.	AT PHILADELPHIA, July 7. R. A.	W. A.
Lump	$—	$5 00	4 50	— —
Steamer	— —	5 00	— —	— —
Broken	— —	5 25	— —	4 25 to 4 40
Egg	5 75 to 6 25	5 25	— —	4 25 to 4 40
Stove	— — to — —	5 75	— —	4 25 to 4 40
Chestnut	4 50 to 5 40	4 75	—	4 00 to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	6 00	— —	— —	— —
Broken	5 75	— —	— —	— —
Egg	5 60	— —	— —	— —
Stove	6 00	— —	— —	— —
Chestnut	5 25	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A.	— —	— —	— —
New England	"	— —	— —	— —
Locust Dale	W. A.	— —	— —	— —
Honey Brook, L'h	W. A.	5 25 to 6 00	— —	— —
Spring Mountain	"	5 25 to 6 00	— —	— —
Sugar Creek	"	5 25 to 6 00	— —	— —
Sugar Loaf	"	5 25 to 6 00	— —	— —
Old Comp'y's.	"	5 25 to 6 00	— —	— —
Cross Creek	"	5 25 to 6 00	— —	— —
Enterprise	"	"	— —	— —
Girardville	"	"	— —	— —
McMichael	"	"	— —	— —
Shamokin	"	"	5 50	4 50 — —
Lykens Valley	"	"	— —	— —
Broad Top	"	"	5 50	— —
Hill & Harris	"	"	— —	4 50 — —
Henry Clay	"	"	— —	4 50 — —
Powelton	"	"	5 50	4 50 — —

(*Dealers in these coals may be found in our advertising columns.)

Prices for Coal at Mauch Chunk.

	F. L.	Bro.	Gra.	Eg.	Sto.	Cst.
Lehigh	$3 00	$3 50	$3 50	$3 50	$3 75	$3 00
Wilkesbarre	3 00	3 50	3 50	3 50	3 75	3 00

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein	f.o.b. at Phila.	$5 00
Lemon	" "	4 75
Cumberland Vein Coal		5 00
Cumberland C. & I. Co.'s on board	N. Y.	7 00
Maryland Coal Co.	"	7 00
Consolidated Coal Co.'s	"	7 00

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port						
Pittston at Newburgh	4 30	4 50	4 50	4 60	5 10	4 20
Lackawaxa at Rondout	4 60	4 70	4 80	5 00	5 25	4 60
*Wilk'b're at Hoboken	4 65	4 75	5 00	5 25	5 50	4 60
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	5 50	5 25	5 25	5 25	5 50	4 75

For freights to different points, see "Freights."

*25c. advance alongside.

Prices at Baltimore—July, 1870.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 30@5 50
Pittston and Plymouth, do	5 00@5 25
Shamokin Red or White Ash, do	5 50@6 00
Lykens Valley Red Ash, do	5 40@5 50
Zerba Valley	25 5@— —
By retail, all kinds per ton of 2240 lbs.	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	4 75@5 00
Fairmont and Clarksburg gas, f. o. b. at L. Point	5 35@5 50

Prices at Georget'n, D.C., & Alexandria, Va.

July, 1870.

George's Creek and Cumberland f. o. b. for shipping..$4 55

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@— —
Lykens Valley	— —@— —
Shamokin Red or White Ash	— —@— —
Trevorton and Zerba Valley	— —@— —

Prices of Gas Coals.

July, 1870.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr. 73 Pine st., N.Y.

Duty, $1 25, gold.	Coarse.	Slack.
Block House	$1 75	@- 75
Gowrie	1 75	@- 75

Corrected by Bird, Perkins & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 75	@- 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Coarse.	Slack Currency.
Fairmount Gas Coal Co. of N. Y.	7 50	@- —
Despard Coal Co.	$7 50	@- —
Penn	— —	@- —
Newburg Orrel Gas	— —	@- —
West Fairmount Gas Coal	8 00	@- —

AT PHILADELPHIA.

Powelton	$7 80

Prices of Foreign Coals.

July, 1870.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 00@12 00
" House "	13 50@15 50
" Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven	$2 00

From Port Carbon, 8 cents per ton more.

Less drawback of 80 cents on all Coal shipped east of New Brunswick and south of Cape Henry.

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 81
C. R. R., N. J., Easton to Elizabethport	1 12
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 28

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$ 81
C. R. R., of N. J., Easton to Pt. Johnson	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 81
Morris & Essex R. R. Easton to Hoboken	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO SOUTH AMBOY.

L. V. R. R.	81
B. & D. R. R.	1 09
Cam. & Am. R. R.	
Shipping Expenses	25
Total	$2 15

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	95
C. RR. of N. J. Easton to Elizabethport	1 19
Shipping expenses	25
Wharfage	10
Total	$2 49

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 07
" Port Carbon	1 10
" Port Clinton	1 00

TO NEW YORK.

From Schuylkill Haven	$1 70

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$0 70
Freight and towage	1 07
Total	$1 77

TO NEW YORK.

Lehigh Canal	$ 40
Morris "	1 10
Freight	
Towing	
Total	$ 2,50

TO JERSEY CITY.

Lehigh Canal	$ 40
Morris "	
Freight	2 00
	2 40
For re-shipment	2 20
Total	$4 60

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,25
Towage	20
Total	$ 2,50

TO NEW BRUNSWICK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,05
Total	$ 2,10

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Foreign and Provincial Freights.

July, 1870.

Foreign.	
Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool	12s.6d@14. ton

TO NEW YORK.

Provincial	
Sidney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.	
Sydney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Freights.—JULY, 1870.

TO EASTERN PORTS.	From Philada'a.	From E. Port and Port Johnston.	From Newbury...	From Rondout...
	$	$	$	$
Amesbury	2 75	— —	1 60	
Bangor	2 75	— —		
Bath	2 00	2 00	— —	
Boston	2 60	1 63	2 00	1 75
Bridgeport	1 60	1 00	1 10	1 20
Bristol	2 00	1 25	1 40	
Cambridgeport	2 50	2 00		
Derby	2 00	— —		
Dighton	1 85	— —	1 45	
East Cambridge	2 50	2 00		
Fall River	1 75	1 25	1 40	
Hackensack	1 95	1 50		
Hartford	2 75	1 35		
Jersey City	1 75	50		
Middletown	— —	1 25		
Mystic	1 75	1 25	1 30	
New Bedford	1 75	1 40		
Newburyport	2 15	2 00		
New Haven	1 70	1 00	1 10	1 20
New London	2 00	1 15	1 25	1 30
Newport	1 75	1 25	1 40	
New York	1 25	50	70	
Norwalk	1 70	1 00	1 05	
Norwich and tow	1 70	1 35	1 35	1 40
Pawtucket	1 90	1 50	1 60	
Portland	2 00	1 75		
Portsmouth, N. H.	2 00	2 25		1 85
Providence	1 75	1 40	1 45	1 45
Rockport	2 10	— —		
Saco	2 30	2 10		
Sag Harbor	2 00	1 40	1 30	
Salem	2 00	1 60		1 75
Stamford	2 00	1 00	1 00	
Stonington	2 00	1 30	1 25	
Taunton	2 75	2 00		
Warren	— —	1 40	1 45	
Washington	1 10			
TO RIVER PORTS.				
Albany		90	- 60	
Catskill		- —	- 50	
Cocksackie		- —	- 50	
Coeyman's		- —	- 75	
Cold Spring		- —	- 35	
Fishkill		- —	- 30	
Haverstraw		50	- 60	
Hudson		- —	- 50	
New York		- —	- 70	
Nyack		50	- 60	
Poughkeepsie		- —	- 35	
Rhinebeck		- —	- 30	
Rondout		- —	- —	
Saugerties		- —	- 40	
Sing Sing		- —	- 75	
Stuyvesant		- —	- 55	
Tarrytown		80	- 75	
Troy		90	- 75	
West Point		- —	- 35	
Yonkers		40	- 60	

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven,	$ 40
Bridgeport,	40
Southport,	40
Westport,	40
Norwalk,	40
Stamford,	40
	Per Boat.
Greenwich,	$70 00
Port Chester,	80 00
Mamaroneck,	70 00
Glen Cove,	—
New Rochelle,	55 00
East Chester,	60 00
West Chester,	30 00
White Stone,	30 00
College Point,	25 00
West Farms,	25 00
Flushing,	30 00
Harlem and Mott Haven,	20 00
Port Morris,	20 00
Ninety-first street and Astoria,	16 00

Boats beyond Port Chester, with less than 200 tons, $80 per Boat.

METALS.

NEW YORK, July 8, 1870.

IRON.—Duty: Bars, 1 to 1½ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 9 ₱ ton; Polished Sheet, 3 cents ₱ lb.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	33 00@36 00
Pig, American, No. 1	32 00@33 —
Pig, American, No. 2	30 —@31 —
Pig, American, Forge	29 —@30 —
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@100 00
Bar, Swedes, ord'y sizes, less 5 ₱ ct. cash	110 —@ — —
Bar, Refined, " "	— —@ 77 50
Bar, Common " "	72 50@ — —
Scroll " "	87 50@115 —
Ovals and half-round " "	95 —@110 —
Band " "	95 —@ — —
Horse Shoe " "	95 —@ — —
Rods, ⅜ to 3-16 inch " "	85 —@124 —
Hoop " "	105 —@145 —
Nail rod, less 5 ₱ ct.	— 7 @— 7½
Sheet, Russia, as to Nos. (gold)	— 11@—11½
Sheet, Single, D. and T. Common	4¾@— 5¼
Sheet; Galv'd. Nos. 14 to 26 12 and 14 c. 25@30 c. 0 6	
Rails, English (gold), ₱ ton	59 00 @60 00
Rails, American, at Works in Pa.	71 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ₱ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 13 @— 15
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— — @— 18
American, Spring, do.	— 9 @— 11
American Machinery, do.	— — @— 12
American German, do.	— 9 @— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 30
Copper Bolts	— @— 30
Copper Braziers, 16oz. and over	— @— 30
Copper Nails	35 @— 36
Copper, Old Sheathing, &c., clean	— @— 17
Copper, Chili Pig	— @— —
Copper, American Ingot	19¼@ 20½
Yellow Metal, New Sheating	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs.	$— — @— —
Spanish (gold)	6 20 @6 25
German, do.	6 20 @6 40
English, do.	6 20 @6 45
Bar (net)	— — @7 37½
Pipe and Sheet (net)	— — @7 25

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold ₱ lb.
Banca	— @39½
Straits	— @38
English	— @35¼

PLATES.

	Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ₱ box	$8 75 @9 —		$10 00 @10 50
I. C. Coke	7 — @7 75		8 25 @ 9 25
Coke Terne	6 — @6 25		7 25 @ 7 75
Charcoal Terne	7 75 @8 25		9 — @ 9 50

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100 lbs.

	Gold.
Plates, Foreign ₱ 100 lbs.	$5 85 @6 25
Plates, Domestic ₱ lb.	7 @— 11½

REMARKS.

IRON.—The demand for Scotch Pig has almost entirely subsided, and prices have a softening tendency. American meets with very little inquiry, and prices are irregular; the sale of 75 tons Foreign, previously noted, was on time. The market for Rails continues fairly active, and prices are very firm; 500 tons old Double-headed sold at $40, gold; 1,000 do. English Fish Plate, 56 lb., to arrive, and 500 do. American, 56 lb., on private terms. Bar from store continues depressed, and we hear of no sales from first hands.

LEAD.—There is very little inquiry for Pig, and we hear of no sales; stocks, however, are not urged, and prices are nominally unchanged, say $6 20 @ $6 25, gold, for ordinary Foreign. Bar is reduced to 7½ cents, and Sheet and Pipe to 7¼ cents, net cash.

TIN.—The demand for Pig is still almost wholly confined to Straits, which remains steady at previous rates; 300 slabs Straits and Billiton sold at 3 cents. English is nominal at 35¼ @ 35½ cents, and Banca 39 @ 39¼ cents, all gold. In Plates there has been considerable business within the past fortnight not reported till now; the transactions foot up about 8,000 bxs., at $8 75 @ $8 87½ for Assorted Tin, I. C.; $7 50 @ $7 62½ for I. C. 14 by 20; $7 25 @ $7 37½ for Coke, 10 by 14, and $7 75 @ $8 for Charcoal Terne, all gold.

COPPER.—Manufactured is steady at our quoted rates. The demand for Ingot has fallen off, and the market has become quite dull; prices are without quotable change, though they rather tend in buyers' favor. The sales have been confined to 75,000 lbs. Lake, in lots, at 20¾ cents; and 50,000 lbs. Baltimore at 20 cents, cash.

STEEL.—All kinds are steady at our quotations for lots from store.

SPELTER—Is dull, and prices are nominally as before.

ZINC.—Am. Ox. Zinc, 6½ @ 7c.; French do., 9 @ 9½c.; Sheet Zinc, 9 @ 9½c.

MANGANESE—4 @ 4½c.

Mining Stocks.

NEW YORK, July 8, 1870.

Business continues dull, and prices have declined still lower. Sales yesterday at the Board were limited to 100 shares of Gregory at $1 15, 1,000 Grass Valley at 40 @ 43c., and 200 Black Hawk at 25c.

Petroleum stocks continue without material change in prices, being quoted as follows:

	Bid.	Asked.
Bennehoff	35	40
Bergen Coal and Oil	40	50
Bliven Oil	40	—
Brevoort	1 05	—
Buchanan Farm	45	50
Central	62	68
Home Petroleum	—	4 50
National	25	—
N. Y. & Alleghany	2 00	—
Northern Light	50	75
Pithole Creek	1 30	1 45
Phillips	15	25
Rathbone	—	40
Rynd Farm	30	35
Second National	—	75
Tar Farm	20	—
Clinton	1 00	—
Blood Farm	50	—
United Petroleum Farms	20	23
United States	—	50

San Francisco Stock Market.

A telegram from San Francisco, July 7, quotes the leading mining stocks there at figures slightly advanced. They are as follows:

Savage	39½	Gould & Curry	71
Yellow Jacket	37¼	Belcher	6
Kentucky		Imperial	35
Chollar Potosi	33¼	Amador	

The Slate Trade.

NEW YORK, July 2, 1870.

[Corrected weekly.]

PRICES OF ROOFING SLATE.

("square" represents 100 superficial feet.)

Vermont purple, 1st quality, per square	$9 50@10 50
" green, 1st " "	9 50@10 50
" red, 1st " "	15 00@16 00
" variegated, "	8 5 @ 9 50
Pa. b'k and d'k blue, 1st qual., "	7 00@ 8 00

SHIPMENTS OF SLATE OVER THE LEHIGH VALLEY, AND LEHIGH AND SUSQUEHANNA R. R., AND THE LEHIGH CANAL:

For the week ending July 2, 1870.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Jones & Williams	squares.
Lehigh Slate Co.	"
Saylor & Morgan	105 "
Kuntz & Woodring	"
Girard Slate Co.	70 "
J. Anthony	70 "
D. Thomas	35 "
Blue Mountain Slate Co.	"
Locke Slate Co.	850 "
American "	"
D. Williams & Co.	"
Keystone Slate Co.	"
Hope " "	"
Star " "	"
Columbia " "	"
Jones & Town	140 "
Total	1250 "

SCHOOL SLATES.

D. Williams	98 cases.
Lehigh Slate Co.	96 "
A. W. Lerch	1 "
Locke Slate Co.	"
Total	195

MANTELS.

Yerkes & Martin	cases.
Lehigh Slate Co.	13 "
Total	13 "

BLACK BOARDS.

Lehigh Slate Co.	6 cases.

LEHIGH AND SUSQUEHANNA R. R.

ROOFING SLATE.

Eagle Slate Co.	squares.
Continental	"
Thos. W. Parry	140 "
Twin City Slate Co	"
J. H. Walp	"
United States	35 "
Lehigh River Slate Co.	"
William Chapman	"
Mauch Chunk Slate Co.	"
New York and Penn. Slate Co	"
Philadelphia	35 "
Heimbach Slate Co.	80 "
Total	290 "

SCHOOL SLATES.

A. W. Lerch	190 "

	Week.	Previously.	Total for Year.
L. and S. R. R.	290	3,119	3,409
L. V. R. R.	1 250	8,585	9,835
Lehigh Canal	"	762	762
Total	1,540	12,466	14,006

MINING COMPANIES AND STOCK QUOTATIONS.

GOLD AND SILVER COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Alameda Silver		A. Queran, 108 Wall st.	$2,000,000	$10 00		
Ada Elmore	South Boise, Idaho					
American Flag	Nevada District, Col.	P. P. Fullerton, 71 B'way.	600,000	10 00	9	12
Atlantic and Pacific	Humboldt Co., Nevada.					
Bates and Baxter	Colorado			50 00	15	
Benton	Colorado	W. F. Drake, 15 Broad	500,000	5 00	7	12
Briggs	Colorado	J. P. Davies, 19 Cliff	1,000,000	100 00		
Black Hawk	Colorado	C.T. Whittington, 48 Broad.	2,500,000	100 00	25	26
Bobtail	Colorado	J. Stanton, Jr., 25 Nassau.	1,000,000			
Bullion Consolid'ed Gold	Colorado					
Burroughs Gold	Colorado					
Central Gold					24	28
Consolidated Gregory	Colorado				1 20	
Combination Silver	Nevada			100 00		1 50
Columbia Silver	Austin, Nevada	J. M. Brown, 155 B'way.	5 000,000			
Commercial Silver		J. E. Smith, 26 Pine	3,000,000			
Corydon	Gilpin Co., Colorado	J. Samuels, 40 B'way	500,000			
Downieville	Colorado		2,500,000	25 00		
Eagle Gold	Gold Dirt Dist., Col.	J. P. Davies, 19 Cliff	300,000	1 00		
Empire Gold and Silver	Bodie Bluff, Mono Co. Cal	H. K. Gates, 70 B'way	1,000,000			
Edgehill		A. Fullerton, 71 B'way	10,000,000			
Esperanza Silver		Ezra Clark, Jr., 13 William	400,000			
Fisk Gold		H. Johnson, 195 Fulton	500,000			
Forest Queen		E. B. Beet, 62 B'way	1,000,000			
Golconda Gold	Sherbrooke, C. E.	H. Adams, 71 Broadway	2,000,000			
Gunnell Gold	Colorado	J. H. Rolston, 80 B'way	1,000,000	50 00	15	
Gunnell Central	Colorado	C. B. Bostwick, 16 B'way.	3,000,000	10 00		
Gold Rock		R. M. Lockwood, 93 Wall.	400,000			
Grass Valley					42	44
International Silver		J. W. Brazier, 26 Pine	600,000			
Hope Gold	Colorado		5,000,000			
Holman			2,000,000	25 00		
Kipp & Buell	Colorado		300,000			
Knickerbocker Gold		J. H. Rolston, 80 B'way	200,000	100 00		
La Crosse Gold	Nevada Dist., Col.	P. P. Fullerton, 71 B'way.	1,000,000		12	13
Lander Hill T. & S.	Nevada	M.L. Catherwood, 74 B'way.	1,000,000			
Lewis Gold	Georgia		1,000,000			
Liberty Gold					02	
Manhattan Silver	Nevada	M. L. Ogden	400,000		6½	7¼
Maraposa common	California	Jas. H. Ferdon, 34 Wall	12,000,000			
Mariposa preferred	California	do. do.				
Montana Gold		G. De Cordova	400,000			
Montana M. L. & M. Co.	Montana	A. M. Hoyt, 22 William	250,000			
Montrose	Clear Creek Co., Cal.	W. W. Perkins, 71 B'way	1,000,000			
New York Silver	Nevada	Thos. Sproull, 78 B'way	1,500,000			
New York and Austin	Nevada	E. R. Slocomb, 70 Wall	500,000			
New York and Owyhee	Owyhee Co., Idaho		1,000,000			
New York and Eldorado		G. H. Munroe, 10 Wall	2,000 000		20	
N. Y. & Montana M. & D.	Montana	F. A. Chapman, 20 Nassau.	1,250 000			
N. Y. & Silver Peach	Nevada	R. C. Root, 74 B'way	2,000,000			
N. Y. & Utah P. & M.		W. H. Mailler, 108 Wall				
Nye						
Ophir Gold	Comstock Lode, Nev.	L. C. Warner, 70 B'way	625,000			
Owyhee Gold		W. H. Smith, 43 Ex. Place.	1,700,000			
Pahranagat Central	Nevada	J. E. Smith, 25 Pine	6,000,000			
Quartz Hill Gold		F. Bernard	2,500,000		20	
Reese River Consol'd	Nevada	W. B. Ogden	6,000,000			
Rocky Mountain	Colorado	S. M. Pond, 70 B'way	500,000	10 00	5	7
Rollins Gold		Thos. Bond, 132 B'way	600,000			
Sensenderfer	Colorado	H. A. Shewill, 19 Broad	1,000,000			
Silver Bend		F. W. Macy, 20 Nassau	1,500,000			
Silver Mt. Silver		H. A. Moen, 71 B'way	1,000,000			
Silver Peak & R. M.	Nevada	W. B. Ogden, 52 Wall	5,000,000			
Smith & Parmelee	Colorado	W. H. Hollister, 6 Broad	2,500,000	20 00	90	1 05
Social & Steptoe Con.		T. H. O'Connor, 24 Nassau.	450,000			
Standard Gold		C. B. Bostwick, 169 B'way.	500,000			
Symonds Forks						75
Twin River Silver	Nevada	J. F. R. Hadden, 20 Nassau.	800,000	100 00		
Texas Gold	Colorado		500,000	10 00		
Union Gold	Colorado	F. A. Potts, 110 B'way	1,200,000			
Wash. Mill & Silver	Nevada	W. W. Perkins, 71 B'way.	300,000			
Wauba Yuma	Arizona	J. W. Silsby, 36 Pine	6,000,000			

COAL AND IRON COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Coal Co.		M. A. Myers, 119 B'way	$1,500,000	$25 00		
Ashburton Coal Co.		J. T. Rollins, 41 Pine	2,500,000			
Block House Coal		D. B. Keeler, Jr., 43 Pine	1,000,000			
Brewster Iron		H. Robison, 165 B'way	150,000			
Broad Top Coal & Iron Co	Pennsylvania	B. Love	2,000,000			
Cameron Coal Co.		J. A. Simpson, 40 B'way	2,500,000			
Carbon Hill Coal Co.		J. Silsby, 36 Pine	1,000,000			
Central Coal		F. P. White, 111 B'way	2,000,000	100 00		
Clifton Iron Co.		P. H. Riordan, 34 Pine	1,250,000			
Columbia Iron		F. D. Webb, 77 Cedar	1,000,000			
Consolidation Coal	Maryland	J. S. Mackie, 71 B'way	5,000,000			
Crawford Coal		E. Clapp, Prest, 137 B'way.	1,000,000			
Cumberland C. & I. Co.		E. Kiscan, 90 B'way	5,000,000			
Derby Coal Co.		W. S. Davison, 11 Broad				
Dover Coal and Iron Co.		L. Chase, 88 Wall				
Del. & Hudson Canal Co.		R. H. Nodyne, 7 Nassau	15,000,000	100 00		
Ebervale Coal		G.L. Stout, Treas., 111 Br'y.	500,000			
Fall River Bituminous		D. T. Blauvelt, 43 Pine	1,000,000			
Farrar Coal		C. H. Jones, 43 Pine	250,000			
Fisher Iron Co.		M. Ellis, 19 William	100,000			
Hampt're & Balt. Coal		S. M. Pond, 70 B'way	500,000			
Iron Cliffs Co.		C. J. Canda, 52 Wall	1,000,000			
Jackson Iron		G. P. Loyd, 119 B'way.	300,000			
Kemble Coal & I. Co.		R. A. Wight, 26 Ex. Place.	300,000			
Keokuk Coal		J. F. Franklin, 112 B'way	100,000			
Lackawanna I. & C.	Pennsylvania	E. C. Lynde, 52 Wall	1,200,000			
Lewis Run C. & I. Co		C. A. Sanborn, 80 B'way	750,000			
Lyckens Val. Coal Co.		F. A. Platt, 13 William	800,000			
McKean Co. Bit. Coal Co.		J. H. Rolston, 80 B'way	1,500,000			
Lehigh & Susquehanna		E. W. Carh, Philadelphia, Pa.			1 10	
Mahanoy			400,000	100 00		
McNeal C. & I. Co.		C. C. Godwin, 71 B'way	500,000			
Mount Riga Iron		G. M. Newton, 42 Cedar	300,000			
New Boston Coal		C. H. Ogden, 55 B'way	2,000,000			
N. Y. Con. C. & I. Co.		A. T. Levine, 16 Wall				
N. Y. & Lehigh Coal		T. Simpson, 111 B'way	150,000			
Pacific Coal Co.		G. Wrighton, 34 Wall				
Peekskill Iron Co.		W. Murdock, 7 Nassau				
Pennsylvania Coal Co.		E. H. Mead, 111 B'way	3,200,000	50 00		
Richmond Iron Co.		T. H. Smith, 165 B'way	1,000,000			
Scotia Coal Co.		T. S. Soper, 42 B'way	2,500,000			
Spring Mt. Coal		J. Runyon, 111 B'way	1,250,000			
Springfield & D'p Run C.		F. D. Webb, 77 Cedar	600,000			
Stout Coal Co.		G. S. Comstock, 111 B'way.	500,000			
Susquehanna & Wyoming		E. Potter, 40 B'way	1,000,000			
Tannerdale Coal		I. T. Ludlaw, 71 B'way	250,000			
Wash. Mutual Coal		M. C. Baker, 117 B'way	420,000			
West Point Iron Co.		R. C. Brock, 110 B'way	500,000			
Wilkesbarre C. & I. Co		W. H. Tillinghast, 80 Br'y.	3,400,000			
Wyoming Val. Coal Co.		E. Potter, 40 B'way	1,000,000			

COPPER AND LEAD COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED
Anita Copper	California	J. A. Ferguson, 8 Wall				
Corinth Copper	Corinth, Vermont	S. H. Howard, 191 B'way.	$500,000	25 00		
Davidson Copper						
Eagle Harbor Copper	Michigan.	W. H. Smith, 43 Ex. Place.	500,000	25 00		
Evergreen Bluff Copper	Michigan	F. W. Caper, 44 Ex. Place.	500,000	25 00		
Globe Copper		R. K. Rickard, 19 Nassau	200,000			
Grand Portage Copper Co		A. S. Kellogg, 22 Pine	500,000			
Guymard Lead		Samuel Vernor, 38 Pine				
Hilton Copper		W. H. Smith, 43 Ex. Place.	500,000			
Hope Copper		J. W. Davis, 19 Nassau	500,000			
Hudson River Copper	New York	T. Clarkson, 22 William	1,500,000			
Indiana Copper Co.		J. M. Mills, 25 Nassau	500,000			
Isle Royale Copper	Michigan	F. W. Caper, 44 Ex. Place.	1,000,000			
Keweenaw Copper	Michigan	F. W. Caper, 44 Ex. Place.	500,000			
Lake Superi'r Silver Lead	Michigan	A. S. Kellogg, 22 Pine	1,000,000			
Omiga Copper	Michigan	S. Cooper, 7 Pine	500,000			
Ridge Copper	Michigan	J. L. Gardiner, Jr., 43 Ex. P	500,000			
Rockland Copper	Michigan	A. Fullerton, 71 B'way	500,000			
St. Joseph Lead	Michigan	J. W. Jones, 6 Broad st,	1,000 000			
St. Marguret Copper		E. P. Sutton, 43 Pine	250,000			
Schoolcraft Copper		R. Walsh, 22 William	500,000			
Superior Copper	Michigan	A. Fullerton, 71 B'way	500,000			
Union Copper		A. S. Kellogg, 22 Pine	500,000			
Vermont Copper	Vermont	J. C. Ely, 191 B'way	500,000			
Wallkill Lead, asst.		S. M. Pond, 70 B'way				10

MISCELLANEOUS.	SITUATION MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Zinc Co.		W. E. Lawton, 19 Cliff	$1,000,000			
Bigelow Blue Stone Co.		H. Bogardus, 14 Pine				
Quicksilver					7	7½
Quicksilver Pref.						14¾
Manhattan Marble		H. K. Gates, 70 B'way	300,000			
N. Jersey Zinc Co.	New Jersey	A. H. Farlin, 61 Malden L'e.	1,500,000			

[FROM OUR SPECIAL CORRESPONDENT.]

Excursion in the Coal Regions.

By the courteous invitation of CHARLES PARRISH, Esq., President of the Wilkesbarre Coal and Iron Company, your correspondent was included in a party of favored guests, about thirty in number, and comprising many prominent citizens of New York, gathered for the purpose of an excursion to the mines at Wilkesbarre, Pa.

Crossing at the foot of Liberty street to the terminus of the Central Railroad of New Jersey, we found a special car, fitted up with all the comforts and luxuries of modern railway travel. A permanent table in the center, perpetually supplied with viands and dainties, (ST. PAUL'S famous recipe for the stomach-ache not being forgotten,) was patronized from time to time with the appetite which travelling begets. The table was arranged in a "ship-shape" manner, to prevent the various utensils from leaving their places, by reason of the movement of the car; but the contents of the dishes, not being restrained by any such device, were observed to disappear rapidly, keeping time with the movements of the passengers, according to the ancient maxim, "When you opens your mouth, then you bends your elbow."

We were soon speeding on our way to Phillipsburg, through the richest portion of New Jersey. Picturesque landscapes continually opened to our view. At every point new houses were visible, and thriving villages appeared, scattered along the whole line. These are principally built through the foresight and energy of the officers of the Central Railroad Company, and now afford to the company a steady stream of paying travel. Many delightful residences are now building along this route, and it is surprising that the crowded population of New York does not, in still greater numbers, seek fresh air, and cheap, pleasant homes in this beautiful neighborhood.

At Phillipsburg, we cross the Delaware river to Easton, passing above the inclined plane of the Morris canal, where the unaccustomed observer may see with surprise boats literally navigating the dry land, as they are drawn from the river up into the canal. The engineering constructions at this point are highly interesting. Here we have bridge over bridge, one locomotive passing above another, and both together, in turn, over the horse-cars on a still lower level; while, beneath all, the river flows, bearing fleets of boats upon its bosom. Phillipsburg is the junction of four railroads—the Lehigh Coal and Navigation Company's, the Lehigh Valley, the Central of New Jersey, and the Belvidere and Delaware. We took passage by the first of these roads, which runs along the north side of the Lehigh river, frequently in sight of its slow but sure competitors, the Lehigh (Delaware Division) and Morris canal, creeping along the river bank, reminding one of the fable of the hare and the tortoise. The Lehigh Coal and Navigation Company's railroad is a new and beautiful road, thoroughly constructed, ballasted, and appointed, and furnished with steel rails throughout. Already its effect is visible in the appearance of many towns along its route.

Bethlehem, the next place of note on this road, is one of the oldest towns in the State of Pennsylvania. It was settled by the Moravians, than whom no Christian missionaries ever more devotedly, faithfully, and lovingly aided to spread the religion of peace. On the south side of this town now stands the Episcopal College, founded by Judge PACKER, and erected under the superintendance of Professor COPPEE. The same denomination has secured also a very beautiful site, upon which it is intended to erect a female seminary.

Leaving Bethlehem, we pass the Lehigh Iron-works, which line the banks of the river for a considerable distance. Hither ores are brought from Pennsylvania, New York, New Jersey, and the Canadas. This enormous establishment consumes annually more than a million tons of anthracite coal in the manufacture of pig iron. The coal is dumped from the cars into the jaws of these huge salamanders, and carload after carload disappears with astonishing rapidity. The limestone used as a flux is found abundantly in the hills near the furnaces. Further on, we come to rolling-mills, turning out the best railroad iron. Car-wheel and axle-shops also have a place in this great chain of manufactures, called into being by the necessities of our railroad system. There are also zinc-works along the river, the ore (calamine, etc.,) being obtained from mines in the neighborhood. Then there are mineral paint works, and establishments manufacturing from the rocks of this region cement of the finest quality. Numerous slate quarries, sending their product far and near, contribute to swell the productiveness of this truly rich and prosperous section.

Proceeding on our way, we pass through the Lehigh gap, where the river finds a tortuous path through the mountains. For a moment we feel that our train must either come to a halt or plunge headlong into the river, when suddenly a sharp curve reveals the way out, and shows us the engine almost doubling on its track within the length of the train.

Mauch Chunk, the next place of interest, deserves columns of description, where we can give only words. This is the shipping point of the Lehigh Coal and Navigation Company. The coal is received from the cars into shutes, on and around which there are six miles of railroad track. From these shutes, which are directly on the canal, the coal is discharged into the canal-boats below, and sent forward to the consumer.

Continuing along the precipitous banks of the Lehigh, with he towering mountain on one side and the rushing river on the other, an ever-present Scylla and Charybdis, we occasionally emerge into little openings, and through the mountain gorges catch glimpses of infinite beauty and peace beyond. We pass at intervals the ruins of more than a dozen dams, which were used in connection with a canal, until swept away by the terrible freshet of 1862. That destruction was so complete that this part of the canal was abandoned, and the railroad substituted. The irresistible mass of water, resulting from heavy rains, and from the backwater of so many dams, from twenty to thirty feet high, simultaneously swept away, produced the most calamitous results in the destruction of life as well as property. The rushing torrent, by the time it reached Mauch Chunk, had assumed the proportions of an enormous wave or wall of water, more than forty feet high. There were instances in which the cottager and his family, the teamster and his beasts, as well as those employed directly on the river itself, were engulfed in as sudden a destruction as the Alpine hamlet by the avalanche of snow.

At White Haven, several miles above Mauch Chunk, we left the Lehigh river, and crossed the mountain to the Wyoming valley. At the top of the mountain we pass through a tunnel cut thirty years ago, 1750 feet through solid red shale. A run of eighteen miles brings us to the head of the Lehigh Company's planes. The picture presented from this point, 1650 feet above tide-water and 1000 feet above the Wyoming valley, is full of grandeur and loveliness. A valley of magnificent proportions stretches out on either hand till lost in the hazy distance, divided by the winding course of the Susquehanna, which gleams like polished steel, and filled with the evidences of civilization and modern progress. There are railways at all elevations, with their ubiquitous locomotives and trains of coal-cars, stretched along, each for a quarter or half mile. There are inclined planes, miles in length, with their engine houses and tall smoke-stacks, suggesting the thought, what vast expenditure of power is required to lift out of the valley its contributions to the wealth and comfort of the world. Compact villages, with white dwellings and spired churches, alternate with the huge buildings containing the machinery connected with the different collieries, and denominated "breakers." All these, arranged as if by the hand of an artist, and interspersed with grassy slopes and patches of forest, combine to form one of the most impressive views that can be imagined. In the far distance we catch a glimpse of the monument erected at the locality of the historical Wyoming massacre of 1778, near which is a stone, discolored, as tradition informs us, with the blood of victims, slaughtered by order of the Indian queen Esther.

Arriving at Wilkesbarre station, we found coaches in waiting to convey us to the Wyoming Valley House, where, soon after partaking of an excellent, though late, dinner, we retired for the night. Some of our party sallied forth at dawn for a morning ride, and were amply repaid by the charming scenery along the Susquehanna, and by their visit to the famed "Red Tavern," long known as the agreeable terminus or half-way house of a pleasure-ride.

The town of Wilkesbarre has now a population of about 25,000, having doubled in size during the past five years under the influence of the immense coal business developed at this point. The public and private buildings are generally substantial, and the luxurious mansions of River street, fronting the lovely banks of the Susquehanna, indicate refined taste and culture. On this street is situated the Wyoming Valley Hotel, which, with its well-ordered and spacious accommodations, apparently attracts a perpetual crowd of guests. The view from its wide porticos, of bubbling fountains, green trees and grass, bordering the river just beneath, and the lofty hills rising beyond, is one of fairy loveliness, and one can scarcely remember, as he gazes upon it, the thousands of hands that labor deep in the recesses of the earth beneath him, tearing up primeval forests and making them contribute to the uses of an age which never saw their glory.

Approaching Wilkesbarre by rail, we pass the works of the Luzerne Powder Company. This establishment is now making two hundred kegs per day of a powder possessing the peculiar qualities of being non-explosive in bulk, of doing one-fifth more execution than ordinary powder, and of causing a less disagreeable odor.

Breakfast over, six commodious coaches took the party over the property of the Wilkesbarre Coal and Iron Company. After crossing the canal, about one-fourth of a mile from the Valley House, we entered upon the property of this company, which comprises over six thousand acres, and is estimated to contain more than two hundred million tons of coal. First visiting the "Black Diamond" colliery, we noticed a tunnel, out of which was coming a stream of bright black specimens. We looked through them in vain for the slate so common in many coals. Besides this tunnel or drift, which is above water-level, there is a shaft now sinking, which will strike coal measures at one hundred and fifty feet from the surface, and will open up one of the richest and largest deposits of underlying coal anywhere to be found.

On visiting the various breakers on this property, many of us, not familiar with the mode of preparing coal, were surprised at the amount of labor performed to free the coal from all impurities. It seemed to pass through the hands of scores of saucy urchins, who selected the slate and took it away in boxes. They gave us no peace until we complied with their demand to "pay your footing," which is a contribution, however small, exacted of every visitor.

From the "Diamond" we went to the "Kidder" mine and breaker of the same company, also to the "Hollenbach" mine, shaft and slope. "Empire No. 1" came next in order, where, at a distance of hundreds of feet below the surface, and a mile from the opening, is a stable with twenty-one mules. These animals sometimes live wholly under ground for a year at a time. Next we visited "Empire No. 2," then the "Audenried," with its four miles of subterranean gangways. Thence we passed by the "Metcalf and Dana" breaker and slope, and the "Germania" breaker, to "Breaker No. 6," one of the largest in this region. At this mine we passed through a tunnel some two hundred yards, to get to the coal-drift, and thence to a slope running from this drift. At the head of this slope stands an engine, housed in the solid coal, and made to do the work of hauling cars full of coal up an incline of three hundred feet, the steam being furnished through an iron pipe from boilers one thousand feet away.

Thus we occupied nearly the whole day, never once leaving the property of the Wilkesbarre Coal and Iron Company, and travelling over an area greater than that of many a German principality, and contributing to the wealth of the country at the rate of a million tons of coal per annum. The increase of population around Wilkesbarre makes the surface land of the company equal in value for building purposes to the coal land of any other company in the coal region, a fact which greatly enhances the value of the companies property. A pleasant incident was our coming upon a church or Sunday-school pic-nic in a grove, and partaking of delicious berries and ice-cream, tendered by the fair hands of those whose husbands and brothers were at work, begrimed and swarty, in the depths below us. We returned to the hotel for a more substantial meal, and such of our party as felt inclined were afterwards favored with a charming ride, over the Susquehanna, through Kingston, (where was encamped one of the divisions of the G. A. R.) across the Lackawanna and Bloomsburg railroad, (the main route to Harrisburgh) and thence up the mountain's precipitous sides, to the Lance mine.

Pausing here for a few minutes only, we drove on to the village of Plymouth, and thence to a mountain gorge, where we alighted, in the neighborhood of a charming cascade, and plunged once more into the earth, entering this time the oldest coal-mine in the Wyoming Valley. This was SMITH'S mine, where in 1820 the first coal was taken out of the surface of the mountain-side and hauled in carts to arks on the river, which at high-tide were floated down to neighboring towns. Here the coal was sold for fuel and the arks for timber, when the latter were not wrecked on the passage. Mr. ABIJAH SMITH, a Connecticut gentleman, was, we believe, the owner of this bed, and the first person to send anthracite coal to New York. It is not now worked at the old opening, but its subterranean galleries and wild and picturesque location will repay the trouble of a journey to it.

We next visited Avondale, the scene of the never-to-be-forgotten horrors of that dreadful 6th of September, when one hundred and eight souls, confined in this dark Tartarus, were only released by the grim messenger, Death. One cannot resist uncovering his head as he passes over the spot where these doomed men, and the two noble martyrs who perished in the attempt to rescue them, went to their final account. This mine has been made, by recent improvements, one of the safest, if not the very safest, in the entire region.

Returning to the hotel at 9 P. M., some of our party were introduced to Mr. WILKINSON, one of the recent international Harvard crew, who, with two other gentlemen of aquatic celibrity, had come all the way from Seneca lake in Rob Roy canoes, shooting the falls and running the rapids as they journeyed on towards the Chesapeake for Baltimore.

An early start by a special car on the following morning, soon brought us to the foot of the Lehigh company's planes. These are three in number, or more properly, three sections of one plane. The first section is 5400 feet in length, and rises one foot in seventeen; the second is 3000 feet long, rising one foot in seven, while the third or uppermost section is 4000 feet long, rising one foot in ten. Immense engines of 800 horse-power capacity are stationed at the head of each plane, by which twenty-four loaded cars, weighing over 200 tons, are drawn up at once to this amazing height. By this device, eleven miles of heavy locomotive travel, and 75 per cent. of the freight expenses are saved. The trains are dragged by means of an endless wire rope, 2½ inches in diameter, weighing twenty tons. This is the largest and best working plane in the world, and cost, when complete, more than $350,000. Like all the wonders of engineering in this neighborhood, its construction is due to JOHN LEISENRING, Esq., whose genius has made him of more service to the country than hundreds of ordinary mortals combined.

After enjoying the magnificent view of the valley from the uppermost plane until our car arrived around the fourteen mile circuit, we proceeded to Mauch Chunk, stopping only at the artificial trout-pond at Penobscot to allow Judge H——, of Bangor, the gratification of a comparison of scenery, and to view the vain endeavors of the 6,500 captured trout to reascend the mountain stream. Arrived at Mauch Chunk, we soon found ourselves climbing Mount Pisgah on another inclined plane, the grade of which was one foot in four. The cars were drawn by two iron bands, running over a drum thirty feet in diameter. The bands were six and a half inches wide, and three-sixteenths of an inch in thickness, and strongly welded and riveted. This mountain is well named Pisgah, since the splendid view which it commands certainly could not be surpassed by that which can be seen from the spot "where MOSES stood."

A seven miles' ride, at the rate of a mile in two minutes, by the force of gravity alone, during which it seemed as if in our swift descent, we were tearing up the earth before us, brought us to the foot of Mount Jefferson. We stopped once on the way, to see the tunnelling of the Nesquehoning mountain by the aid of compressed air and drilling machines, and to view the coal veins, forty feet in thickness, here opened to the clear light of day. We then ascend plane after plane, descending again with exciting rapidity, until, having completed the twenty-five miles' circuit of the famous "switch-back," we are safely landed beside our train at Mauch Chunk. Soon we are again on our way to the hot city of New York, amusing ourselves *en passant* with various absurd but jolly games, and arriving by ten P. M. at the metropolis, where our pleasant company, with many regrets, breaks up, and its members return reluctantly to the drudgery of daily business.

NEW YORK, July 1, 1870. WORCESTER.

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor,

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Publishers and Proprietors,

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P. O. Box, 5969. NEW YORK CITY.

New Patent Agency.

WE would call the attention of our readers to the announcement elsewhere in the present number, inaugurating the new patent agency of WESTERN & COMPANY. We consider ourselves fortunate in securing the services of Mr. CHARLES ROGERS, one of the most experienced and successful solicitors in the country, long an examiner in the United States Patent Office at Washington, and, moreover, a thorough practical mechanic. Mr. ROGERS will manage this department of our business, and transfers to our agency his present extensive clientage, besides giving us all the benefit of his wide reputation and experience.

Our subscribers and patrons have frequently asked us to obtain patents or negotiate patent business for them, at times when we were not prepared to undertake such work. Now we are fully organized and equipped; and we confidently invite comparison with any other agency in the country, being willing to be judged by the promptness, accuracy, validity, and reasonable expense of the work we do for our clients. Give us a trial.

The Dock Commission.

IN the new City Charter, passed at the last session of the Legislature, the provision creating a Board of Dock Commissioners is one of the most important. The necessity for improvement in the manner of building piers, and for the construction of docks affording increased facilities for loading and unloading cargoes, is apparent to any one who has observed the present disgraceful and inadequate accommodations offered to commerce by the great city of New York. It is highly important both for the navigation of the rivers and for the general health of the city, to have a substantial and uniform waterfront, in order that the sewage may be delivered directly into the current of the river, and carried off at once, or gathered in one straight water-line sewer and removed thence, to be made commercially valuable, and in order to prevent the accumulation of mud and filth in the still water between the piers.

The use of wood for these structures, unless protected by some such ingenious device as that of Mr. THEODORE ALLEN, is unsafe, and, by reason of the frequency of necessary repairs, inadequate to the requirements of a permanent and ever-increasing commerce. The impression made by our wooden piers upon the minds of foreigners visiting our city is not creditable to us. In European countries docks and piers, instead of being an eyesore and an abomination, are of substantial masonry, look clean and neat, and are worthy objects of pride and admiration.

The question how this very desirable reform is to be effected is now occupying the attention of the Board, and various plans embodying new systems and modes of construction have been proposed and discussed. Time is allowed the Board until next May to make the selection of any one plan, or a combination of two or more of the plans submitted. Caution and good judgment are necessary, and at the same time the urgency of the case demands energy and activity.

It must be borne in mind that we are not only making arrangements for the commerce of the present, but also for that of the next century. Expense is not to be spared, and the Commission is not hampered by any conditions whatever. All the river property of the State and city is placed at their disposal, and the right of occupying private property is also granted. The Comptroller is to issue bonds to the amount of $3,000,000 a year, if called upon to do so by the Commission. These bonds are to bear seven per cent. interest, and are not to be sold below par. No check is to be put upon the Commissioners, other than their own integrity. With such unlimited powers, combined with the great natural advantages of the New York harbor, they ought to build for us the finest and best docks and piers in the world. The scheme at present embraces only the East and Hudson Rivers, but will eventually include the Harlem River, which a comparatively small outlay would render suitable for navigation by large vessels.

On the 1st of June, Messrs. JOHN L. AGNEW, President of the Board; WM. WOOD, HUGH SMITH, and R. M. HENLEY, Commissioners; Mr. HENRY, Secretary of the Board; Messrs. NICHOLSON and ISAAC BELL, of the Board of Charities and Correction; PETER COOPER, Esq., and half a dozen other gentlemen, took a trip around the island on a steamer, for the purpose of making a personal inspection of the wharves and piers of the city. Many of the piers on the Hudson River were found to be in good condition, more particularly those used by the ocean steamers. On the East River, many were found in poor repair, and some badly broken, and going to decay as fast as possible. A remarkable fact in this connection is that piers on the Hudson River bring nearly or quite ten times as much annual rent to the city as those similarly situated on the East River. Thus, for example, the pier at Corlear's Hook, on the East River, brings $900 annually; those higher up on the same side, from $500 to $1,000; while those on the Hudson, situated directly opposite, are rented for from $10,000 to $12,000 annually.

During their trip, Mr. PETER COOPER read to the Commissioners and their guests a pamphlet written by him in 1855, wherein he urged upon the Common Council the advisability of then beginning the work of constructing stone piers.

Of the schemes submitted to the commission at subsequent meetings, many embrace a warehouse system and some a railway as well. The streets are now so filled with carts and drays, in those portions of the city near the wharves, that it seems almost impossible to increase their number without entirely blocking up the streets and rendering travel on them, in any direction, an impossibility. This is due to the distance from the piers to the warehouses, which renders it necessary to cross at least one street, while often the goods have to be conveyed several blocks. When the merchandise is designed for re-shipment it has to be carted back to another pier, and when it is for city consumption it also has to undergo another cartage before its distribution for sale. It is evident that by systemizing this business, and using railroad cars during the night time, when these portions of the city are almost deserted, the freight intended for the North and West could be loaded on the cars on the wharves during the day, and shipped directly to its destination at night. Warehouses erected on the wharves could be used for storing merchandise intended for local use, until the owners were ready to remove it directly to their own stores. The Western merchants could become, to a certain extent, their own importers, by having their goods loaded on the through freight cars and the cars sealed by the proper officer. On arriving at their destination, the cars could be unlocked and the seal broken by the custom-house officers of the place, and the duties paid on the goods there instead of in New York. It is doubtful whether such an arrangement would be agreeable to the New York importers, and whether they would be willing to see their own money spent to take business out of their hands. Mr. WADDELL, who recommends this scheme, ought certainly to be very popular with Western merchants. At all events it seems that some such arrangement ought to be made, and if, for the time being, it operates to a certain extent to the disadvantage of the importer, doubtless it would bring with it incidental benefits. By the inauguration of a suitable system of warehouses on the piers themselves, great saving could be effected. In the first place, merchandise stored in fire-proof buildings, isolated from other buildings, with steam engines for extinguishing fire on the spot, and provided with a sufficient number of competent watchmen, would be subject to a much lower rate of insurance than that now charged, when the goods are stored in buildings closely packed together, and, in many instances, in any old tumble-down buildings that the government can hire.

In the second place, certain goods can only be unloaded from vessels lying at the piers during good weather, and much valuable time is lost when it rains. We are informed that three hundred thousand dollars is paid annually by the merchants of New York, for the hire of tarpaulins to cover their goods when exposed to the rain on the piers; and the protection afforded by these coverings, costly as it is, is very inadequate.

Some of the plans submitted embrace also the project of utilizing the sewage, which is estimated at two million tons a year. This is worth, it is said, at least five dollars a ton, and from the sale of it the city could realize the round sum of ten millions a year. On the Thames, a few miles from London, large works have been in operation for several years for the purpose of pumping the sewage of that city into tanks, from which it is conveyed by boats to its destination, and used as manure for the poor lands lying on the sea coast. A uniform water front would render the introduction of such a system in this city a comparatively easy undertaking. A large sewer could be built around the city, (it might properly be called the Boulevard or the Belt sewer) into which all the other sewers of the city should discharge, and the entire sewage of the city could be, by this means, brought together at any desirable point.

Plans for entire systems have been submitted by Messrs. J. BURROUGHS HYDE, W. H. C. WADDELL, PONTEZ, W. H. JOHNSON, BRYAN, THEODORE ALLEN, WILSON, PEBKINS, CHEESEBOROUGH and others, some of which have not yet been read before the Board. In another place we print the excellent address of Judge JOSEPH P. DALY, on behalf of the Citizens' Association, delivered at the first meeting of the Board; we also re-print an article from that very lively and successful paper, the New York *Star*, pointing out the connection between commodious piers and the important question of longitudinal transit.

Link and Valve Motions.

THERE is scarcely any department of steam engineering in which both the builders of engines and those who run them are more in need of clear conceptions and practical guidance than that which relates to the proper proportions and positions of the ports, valves, and cut-off, and of the parts connected with the link-motion. Practice in these respects is largely mere blind imitation. The parts of one engine are copied from those of another, which has been successfully run, and then the adjustments are made by repeated trials. The proportions suitable for a required link-motion are frequently determined by the aid of cumbrous and expensive models.

The natural remedy for this state of affairs is a more thorough compensation of the causes regulating the form and dimensions of cylinders, slide-valves, eccentrics, and, consequently, links. But the proper adjustment of a link-motion cannot be made by mere theoretical knowledge of its laws. The calculation involves the higher mathematics; and any formula constructed for the purpose must contain from sixteen to twenty variables, and will, even then, be inadequate to express the irregular conditions of practice. What is needed, therefore, to supplement the knowledge of principles, is a practical geometrical solution of the problems involved.

Both these desirable aids—a clear explanation and a geometrical construction—are furnished by the excellent work of Mr. WILLIAM S. AUCHINCLOSS, C. E., the second edition of which, issued by VAN NOSTRAND, now lies before us. The reputation of Mr. AUCHINCLOSS as an engineer naturally led us to expect a contribution of value to the professional world; but our anticipations were restrained by the remembrance that too many eminent men condescend to trade upon their fame, and put their names upon the title-pages of works utterly unworthy of them. Scientific and professional text-books are "manufactured" in this way to a disgusting extent; and it is all the more agreeable to us, to light upon a volume like the present, which bears throughout the marks of the original comprehensive conception and conscientious labor of its author.

After a few lucid definitions, Mr. AUCHINCLOSS gives the elementary principles and general proportions of the slide valve, together with a number of tables, mostly original, for finding width of steam port, minimum width of port opening, diameter of supply steam-pipe, etc., for given diameters and speeds of the piston. To this department belongs also the admirable travel scale, a copy of which, engraved on card-board, is affixed to the cover of the book. By means of this scale and diagram, without any instruments or complex calculations, the angular advance of the eccentric, travel of valve, lap and point of exhaust closure, for any given extreme width of port opening and point of cutting off steam, can be at once obtained. Or, if lap, lead, and travel are given, the exhaust closure and cut-off can be determined with equal ease.

Our author now proceeds to consider the general proportions of these parts, as modified by crank and piston connection, thence to adjustable eccentrics, and so to the most complicated arrangement of all—the link-motion. As this is, after all, but a combination of the motion of two eccentrics, it is evidently to be treated in the order here given; and Mr. AUCHINCLOSS, logically developing his subject, and clothing it in a style of great force and clearness, has produced one of the best treatises upon it which has ever appeared in English. The chapters on the independent cut-off, clearance, etc., are less satisfactory. The value of the book culminates in the masterly solution of the complicated problem of the link-motion, and the geometrical method by which this is accomplished. Sprung, as its author tells us, from the necessities of his own practice, it will be welcome to all who have been perplexed and wearied by the difficulties which it removes.

Geological Surveys in the Territories.

WE would call the attention of our readers to the eloquent and suitable speech of Mr. MCCORMICK, of Arizona, delivered the other day in the House of Representatives, and published in another column of the present number of the JOURNAL. Mr. MCCORMICK deserves well of the people of the Territories for the zeal and fidelity with which he watches their interests; and he is entitled to the thanks of all intelligent citizens for the clearness with which he perceives and enforces the great value of science as an aid to industry, and the earnestness with which he urges the Government to recognize the same great principle.

The Cape Cod Ship Canal.

THE project of connecting the waters of Cape Cod Bay with those south of the Cape by a ship-canal, which is now receiving the attention of Congress, is not a new idea. The Plymouth Colony, as early as 1623, in trading with the people south of the Cape, used to communicate across it by boats, which passed up the Scussit river to its head, thence by portage across the narrow neck of land between the head waters of the Scusset and Monument rivers, and thence down the latter river in boats to its mouth, near which the town of Monument stood, up to which, at that time, vessels of eight or ten tons burthen could come. Capt. MILES STANDISH passed over this route in his trading expeditions with the Dutch from Fort Amsterdam, and the French, both of whom used to come to the town of Monument.

As early as October, 1676, this route was examined with a view to determining the practicability of cutting "a passage from the South Sea to the North;" and again in the year 1697, the General Court of Massachusetts took this project into consideration and ordered further examinations to be made. In

1736, the isthmus was described in the "Annals of the Cape" as "the place through which there has been a canal talked of this forty years, which would be a vast advantage to all the country, by saving the long and dangerous passage around the Cape and through the shoals adjoining." Again in 1776, the General Court of Massachusetts considered the matter, and by its direction a partial examination and survey was made. Since that period, the isthmus has been several times examined and reported upon, under the authority of the State of Massachusetts, and also of the United States.

The most important reports upon this subject are that of the "Board of Internal Improvements," of 1824, consisting of Brigadier General S. BERNARD, Lieutenant Colonel J. G. TOTTEN, Corps of Engineers; and JOHN L. SULLIVAN, Civil Engineer, and that of the "Commissioners of the United States in Boston Harbor," of 1860, consisting of General TOTTEN, Professor BACHE, and Capt. DAVIS. To these must now be added a "Report to the Chief of Engineers, U. S. Army, upon the proposed Cape Cod Ship Canal, by Brevet Major General J. G. FOSTER, Lieutenant Colonel of Engineers," published in Boston during the present year. This able and exhaustive treatise of Gen. FOSTER (from which we cull the above interesting facts) agrees with all the preceding reports on the subject in regard ing the project as perfectly practicable, and eminently desirable; and General FOSTER arrived at this opinion after a careful personal examination of the route proposed, and a thorough investigation of the difficulties which apparently lie in the way.

The value of such a canal, if its construction at a reasonable expense is practicable, seems too evident to be called in question. The passage around Cape Cod is the great highway for commerce between the northeastern and southern ports, and for many foreign steamers which touch at Boston, bound to or from New York or ports on Long Island Sound. Most of the coasters, the masters of which are familiar with the difficult navigation of Vineyard and Nantucket sounds, take one of the two routes through those sounds; but large vessels and steamers take the outside course around Nantucket Island and the adjacent shoals, while the direct European steamers and sailing vessels go outside of George's Bank. All these routes are dangerous, but the first three are particularly so. The outside coast of Cape Cod is destitute of harbors from the Race light at Cape Cod to Monomey light at the entrance of Nantucket sound. If a vessel is caught in an easterly gale near this part of the coast, she must go ashore and will probably be a complete loss. This beach is renowned for being very exposed and dangerous, and many vessels have been wrecked upon it. The outside route is equally dangerous, and, in thick weather, equally feared by the masters of the larger class of vessels. After leaving the lights of the Cape, in going south, the mariner has to grope his way in foggy weather between "Fishing Rip" and "George's Bank," until he makes the "New South Shoal light-ship," with the imminent danger ever before his eyes of striking upon one of the shoals in his efforts to avoid others. Some notion of the dangers of the navigation of this part of the coast may be obtained by contemplating the list of vessels and lives lost during the past twenty-seven years. A list of the disasters to vessels passing around Cape Cod for the seventeen years previous to 1860, is given in detail in the report of the Legislative Committee of Massachusetts in 1864, from which it appears that there were wrecked in that time, 4 steamers, 40 ships, 71 barks, 191 brigs, 492 schooners, and 29 sloops, making a total of 827 vessels wrecked, of which 500 were totally, and 327 partially, lost. The loss of life in 72 of the shipwrecks was 320; in 108 of the above cases 155 lives were lost. The total loss of life for the period was 510, or an average of 30 lives each year. The loss of property in 108 of these wrecks was $1,835,500.

The disasters to vessels passing around Cape Cod for the ten years previous to January 1, 1870, were as follows: Steamers 13, ships 23, barks 32, brigs 100, schooners 446, sloops 3; making a total of 617 wrecks, of which 211 were totally and 406 partially lost. It is impossible to obtain a correct record of the total loss of life during this period, but it has been positively ascertained that there were 63 lives lost, and, in addition, seven entire crews. The construction and use of the proposed ship-canal will enable vessels to avoid these dangers. It will also shorten the time of making the passage from ports north of the Cape to those south.

The route from Boston, through the canal to ports south, is from seventy to eighty miles shorter than that through Nantucket and Vineyard sounds, and one hundred and forty miles shorter than that around Fishing Rip. The delay of steamers in passing around the cape is measured by the above distance in miles; but with sailing vessels the case is different. Coming through Vineyard and Nantucket sounds with a fair wind from the northward, they must wait in some of their eastern harbors for a change of wind to enable them to double the cape, as the sailing lines make an angle of less than ninety degrees with each other. Vessels are thus detained for days, and sometimes weeks, and frequently fleets of several hundred sail are seen in Nantucket sound, awaiting a favorable wind to double the cape. Probably no class of vessels suffers more from this difficulty than those bringing coal to Boston and the North-east, of which there are from Philadelphia alone nearly three thousand, making ten trips a year, with a gross tonnage of over one million tons. It is estimated that the detention of vessels by this cause, and by the greater distance, will average three days for each vessel passing the cape.

During last year forty thousand vessels passed Cape Cod, according to the record of the keeper of Vineyard light; and, assuming that fifty per cent. of these would make use of a canal, General FOSTER shows that the yearly saving in expenses of crews alone would be four hundred and fifty thousand dollars, and the total annual saving in expense of crews, insurance and interest on cargo and vessel would be $1,041,666 67.

In addition to the saving of property, it must be remembered that there will be, as shown by the list of disasters given above, an annual saving of *thirty human lives*, the value of which cannot fairly be estimated in money. Putting them down at the minimum money value paid by railway corporations for the people they smash or blow up, we have at least $150,000 more to be added to the above saving.

The value of the canal as facilitating the inland coastwise trade will be very great. Starting from the sounds of North Carolina, a vessel could pass through the Dismal Swamp canal, up the Chesapeake bay, through the Chesapeake and Delaware and Delaware and Raritan canals, through Long Island sound, up Buzzard's bay, through the Cape Cod canal, and thence to any point in the North-east. There would thus be safe inland navigation through or along the borders of ten States of the Union.

In time of war the value of this inland communication cannot be over-estimated, as it would enable vessels bearing the heavy gun-carriages and bulky munitions of war to sail directly from the arsenals of construction to the fortified points where they are to be used. In fact, the military value of the proposed canal, in time of war, would fully equal its commercial value in time of peace; as by its inner and shorter lines it would enable our vessels of war to anticipate and baffle the operations of an enemy's fleet, operating on the outside around the capes. We should thus secure, in addition to the inner line of operations, the element of *time*, which is as important in military operations upon the sea as upon the land.

There are but two routes across the Isthmus that offer great facilities for the construction of a canal; the one by way of Buzzard's and Barnstable bays, and the other across the Isthmus from Hyannis harbor to Barnstable harbor. The latter, although possessing the advantage of a harbor at each end, is much inferior to the former, on account of the high ridge or "backbone" of the cape, which must be cut through; besides, the route would be longer, and would necessitate the passage of many dangerous shoals in Vineyard sound. The Buzzard's bay line, on the contrary, as is seen by reference to a chart, is in the direct line of communication from Long Island sound to Barnstable and Massachusetts bays. The same wind that carries a vessel through the sound and up Buzzard's bay, will carry her through the canal and to all the eastern points.

Buzzard's bay itself is a well-sheltered expanse of navigable water, with good harbors and safe anchorages. There are few dangers, and these can be easily marked. The course is almost directly up the bay to the mouth of Back river harbor, near which the water shoals, rendering necessary the dredging of a channel to connect the entrance to the canal with the deep waters of the bay. The anchorage in Back river basin is well sheltered, and can be easily defended in time of war by a battery upon Marshall's island.

General FOSTER describes the proposed line of the canal, through the Isthmus from Back river harbor, or the mouth of the Monument river, (two points which are close together) as most remarkable in point of physical conformation. It looks as if nature intended a canal to be made at this point, or rather, as if there had once been a channel through which, in ancient iceberg periods, an immense volume of water poured from Massachusetts to Buzzard's bay. The valley is low and broad, and is of diluvial formation, consisting of sand and gravel, mixed with large and small boulders. The direction is nearly north-east and south-west. The tide flows up the Monument river three miles, and its head-waters almost overlap those of the Scussit river, which flows into Barnstable bay. The ridge between the head-waters of the two streams is three-fourths of a mile wide, and only twenty-five feet and some inches above high-water of Barnstable bay. The width of the valley is two hundred and twenty yards at the narrowest point, and gradually expands toward each end. The hills rise on each side of the valley in a gradual slope to heights varying from sixty to one hundred and eighty feet. Nature has therefore cut the canal almost to the high-water level, and presents no obstacles to the excavation of a channel to as great a depth as may be desired, and to a width of two hundred yards if necessary. The loose boulders are too few to interfere with the work of excavation, and will hardly furnish the requisite amount of rubble for backing the ashlar masonry walls at the entrances. No rocky ledges are likely to be encountered, as none of the wells sunk along the route have struck rock or any unusually hard stratum.

The peculiarity of the tides on the two sides of the Isthmus presents some difficulties; but General FOSTER does not regard them as hard to overcome. The southern and northern tide-waves meet and interfere off Nantucket Island. These tides are of different heights, but the Coast Survey has determined that they have a common mean level, above and below which they rise and fall. According to this authority, the tides have in Back river harbor a mean rise and fall of 4.11 feet; in Barnstable bay, of 9.17 feet.

The times of high and low water in the two bays are different; that of high water being three hours and twenty-three minutes, and of low water, four hours and eleven minutes, earlier in Buzzard's bay than in Barnstable bay, while high water in the former occurs after the tide has risen considerably in the latter. The mean of the greatest differences between high water of Barnstable bay and the corresponding stage of low water in Buzzard's bay is found by Mr. MITCHELL, of the Coast Survey, to be 5.79 feet, while for the reverse relation of the basins the mean is 4.66 feet. These differences of level will necessarily cause, in a canal without locks, a rush of water from the higher to the lower level, which will continue until the falling tide of one side and the rising tide of the other come to the same level, when a "stand" will occur for a short time, until the water receives a motion in the contrary direction, after which the velocity will increase to the time of the greatest difference of level, and then diminish until another "stand" occurs; and so on in the same round of motion and counter motion.

It has generally been supposed that the great "head" caused by this difference of the level of the tides would produce a current in the length of the proposed canal (only 7.6 miles) that would render navigation difficult, if not impossible, and thus render necessary the construction of costly locks at each end. The objections to locks in a canal required to pass forty thousand vessels a year are evident. Fortunately, we have the assurance of General FOSTER, based upon a most careful scientific investigation, that an open canal, without locks, is entirely practicable. The HUMPHREYS-ABBOT formula, which, of all the formulæ used by Gen. FOSTER gives the highest results, gives for the mean difference of level of 5.97 feet, and a slope of the water surface of 0.153, a velocity of 5½ feet per second, or 3.8 miles per hour. With the maximum difference of level or "head" of 7.8 feet, and a slope of 0.203, it gives a velocity of six feet per second or four miles per hour. General FOSTER shows, from experience in other waters that this velocity is not too great for a navigable canal. It should be borne in mind that it can only last for a few moments, and will decrease for five or six hours to a "stand," after which the increase will be gradual to a maximum again. Neither the curves of the canal nor the retardation caused by vessels stemming the current are taken into consideration. Moreover, the maximum velocity of four miles per hour will rarely occur in ordinary tides. The velocity of 3.8 miles per hour, the greatest for mean tides, will be all that will be ordinarily met with. By the use of steam-tugs vessels can readily be taken through the canal against the current, the banks being properly protected to prevent damage by the swell.

One great advantage of an open canal, through which the tide may have full sweep, is that it will be kept clear of ice in the winter, and this will be effected not only for the canal itself, but also for the outlet at Back river harbor and the upper end of Buzzard's bay.

At the southwestern end of the canal, Buck river offers a good harbor which only requires to be dredged to the proper depth. From this basin a channel of the same depth must be dredged to the deep water of Buzzard's bay. At the terminus at Barnstable bay, an artificial harbor must be formed by the construction of a breakwater.

The projectors of the canal (a Massachusetts company) propose to construct it complete, to dredge out the shoals at each end, and to do everything to make it a first-class ship canal. They, however, ask that the general government construct a breakwater on the Barnstable bay side, to form an artificial harbor for the protection of vessels in entering or leaving the canal. They represent that, were the proposed canal a natural channel connecting the two bays, the duty of the government to construct the necessary protection to the commerce that would use it, would be apparent. Moreover, that it is not only to serve as a protection to the mouth of the canal, but also as a *harbor of refuge* for vessels caught in this part of the bay by a northeast gale.

There is no doubt that a breakwater will be a great service as a refuge for vessels in the emergency described, and for want of one many vessels have been blown ashore and wrecked on this part of the beach. There is no harbor of refuge nearer than Provincetown, and vessels in a northeast gale, missing that, are driven into the bight of the bay, from which there is no escape. In this view, a breakwater would be of great value to commerce, aside from its utility as a protection to the mouth of the canal.

General FOSTER estimates the cost of a suitable breakwater in this position at something less than $2,000,000. It is to be earnestly hoped that Congress will see fit to guarantee the construction of this work, and thus assure the success of a great national enterprise.

Shall Architects Compete?

Essay read by S. HANNAFORD, Esq., before the Cincinnati Chapter of American Institute of Architects.

THE time has long since gone by when any profession, trade, or calling, could arbitrarily dictate terms of reciprocity with its patrons. Even among the old monarchies of Europe, with their deeply-rutted social systems and feudal trammels binding them to the past, the golden age of barber surgeons and trade guilds has vanished forever. But here, with us, where no vestige of divinity hedges any class or calling—where the people are our patrons, how utterly futile would be the attempt. Still, though we do most fully acknowledge the strength of the spirit of the age in its levelling yet elevating tendencies, our self-respect and professional pride, as well as the best interests of the public, demand that in this the infancy of architecture in America, some broad general principles should be laid down, that, from their exact justice to all, may obtain that common respect as to be a governing element in business intercourse. One phase of this intercourse, which has heretofore been ever a vexed, unsettled question, is that of competitions for public work.

I conceive that, with competitions for the work of a private individual, should any one so elect, we, moving as a body, have no concern, for in this each man is a law unto himself, either to invite or accept competition. In public matters the case is vastly different, whether it be for a community or a corporation. Here, as the magnitude of the proposed undertaking increases, and the interests involved are those of the many instead of the one, it is well that everything be done decently and in order. Every invitation from the public, through their authorized representative, to the profession to enter the lists of competition, should be regarded as a contract, sacredly binding in its obligations, and, therefore, to be jealously guarded as carrying with it the honor and good name of the community or corporation on whose behalf the call has been made, and any breach of the same frowned down by all honest and fair-minded men. In this matter, too, we may rest assured that justice to

one class, or profession interested, is, in reality, justice to all.

Let us, then, weigh carefully the claim of the public upon us in this respect, and our duties in the premises, and, at the same time, properly digest what we conceive to be fair and equitable as a governing principle on this subject of competition. I am aware that for many years there has been a growing disposition among the better class of the profession, to entirely ignore the claims of the public in this respect, but whether it be wise or well founded, is a question worthy of our serious attention. It is true, that the amount of labor and study expended in this direction, as well as the anxieties and suspense entailed upon the profession, are matters but seldom considered, and never fully appreciated by the public. Yet, I am free to say that the principle, the instinct underlying all this, is perfectly legitimate and right, however faulty and objectionable its workings may be. The moving cause is laudable and just.

A corporation or community naturally desire, when about to erect a structure into which they pour their wealth, and around which gathers so much just pride, that they have the very best result of their investment. For they well know that their building of to-day will stand and speak to coming generations of the glory of those whose wealth was the means of its creation, long ages after they have passed away. Tombs, palaces and shrines of all nations, and of every age, proclaim that man's individual and communal pride, and desire for immortality ever have been the most potent motives and controlling elements in the erection of all large public structures; and in proportion as these motives have entered into and fully controlled the builders of the past ages, so do their works impress us of to-day, and challenge our admiration for all that is good and true in architecture. This is, indeed, the very ever-living soul of architecture.

As evidences of the above, I need only remind you of the pyramids of Egypt, the rock-cut tombs of India, the many cathedrals of Europe, the mosques of Arabia, or the rath-houses of the plains of Belgium and Holland, and the campaniles and domes of Italy. But there are many reasons applying to the profession direct, which it is well to consider:

I. Competition is undoubtedly a fully-recognized demand of the age, as far as great public undertakings are concerned.

II. It prevents monopoly, and gives to all an equal chance in the strife for the world's honors and rewards.

III. It is an incentive to study and labor, and, therefore, conducive to the highest good of the profession, which I deem of vastly more importance than the interest of the professor.

IV. It develops many explanations and solutions of the same problem.

I consider each and all of the above propositions as axioms, yet it may be well, in proof of the first, to cite your attention to a few of the leading examples, during the last few years, of the call of the public, and the response of the profession in Europe, where the punctilious etiquette of professional dignity is much more vehemently maintained than with us; as, in England, the Foreign Offices, Albert Memorial, Hyde Park, Law Offices—all Government works—Saint Thomas's Hospital; town halls in nearly every large city in the United Kingdom; and, last, the Liverpool Exchange, which called forth fifty complete sets of designs, and which was notorious among competitions from the liberality of the premiums, the first being $5,000, and not deducted from the successful competitor's final compensation. Now, as to the standing of those who responded, the names of a few will suffice, and I need only mention G. GILBERT SCOTT, EDMUND STREET, W. H. BURGESS, and BARRY, and WATERHOUSE, and BRANDON—all eminent and familiar names.

In France the most important case was the competition for the new opera house in Paris, which was responded to at first by no less than one hundred and seventy-nine distinct designs, out of which a select number of six were again called upon, and the prize finally adjudged to M. GARNIER. The new Palais de Justice, the new Tribunal de Commerce, and the Hotel de Ville in Lyons, are also notable examples. In Germany, the Town Hall of Berlin, H. Wassermen; and later, the submitting of fifty-five designs for the Cathedral of Berlin. In Austria, the Emperor's Opera House, Votive Church, National Bank and Exchange, and Town Hall, all of Vienna. The latter competition called out sixty-three sets of designs—forty-one from German and Austrian architects, sixteen from France and four from Italy. I will only mention one other—the new front of the Duomo, of Florence, Italy, as being all sufficient to prove the truth of the first proposition.

With the results of this country you are all familiar. I would not overlook the fact that our experience has not been pleasant or in any way encouraging. Many heart-burnings, and much chicanery, have been developed, with very much more of rascality, especially in connection with public work, than of good either to the community or the profession. Still, as before stated, I am thoroughly convinced that the instincts moving this matter are just and proper, and it only requires that they be rightly controlled and directed. I believe, too, that the manifest failure and utter impotency of the competitive system with us is mainly the result of ignorance—the absence of any true and proper method of operation, by which the end sought could be obtained with the best results to all concerned.

Allow me here to call your attention to a series of resolutions governing public competitions, adopted by the fifteenth congress of German architects and engineers, held at Hamburg, September, 1868, they having been previously adopted, in the main, by the association of Architects and Engineers of Vienna:

1. The judges must be principally composed of architects. 2. The judges must be named in the instructions, which they shall have sanctioned before publication. 3. The acceptance of the post of judge requires a complete renunciation of every direct or indirect right to compete, as also of any participation in the execution of the work. 4. The instructions must not require more drawings or estimates than are necessary in order clearly to explain the design and construction, and the scale of the drawings must be clearly defined. 5. In naming the amount to be expended, the instructions should clearly state whether the keeping within the limits of such sum will be regarded as so important a consideration as to exclude from competition all designs exceeding such given sum, or whether the amount is approximate only, in which latter case, the competitor will use his own discretion, as to the costliness of his design. 6. A design will be excluded from the competition, if sent in after the stated period, and if it contains considerable deviations from instructions. If from either or both of the above reasons, all submitted designs are rejected, then the judges are bound to publish reasons which led to their verdict. 7. The premiums must be awarded under all circumstances, provided as many designs have been admitted as there are premiums. 8. All designs sent in must be publicly exhibited two weeks. 9. The premiated designs become the property of the client or committee only on execution. 10. The first premium must not be less than the amount which an architect would have received had there been no competition.

In the above there are three cardinal points:

1. The character and ability of the judges are assured that the profession and the community may be shielded from the jobbery of tricksters, often both ignorant and dishonest. 2. The necessity of clearly and sharply defined instructions and conditions of competition, which are to have all the sanctity of a contract, equally binding upon both parties. 3. A fixed and definite compensation, thus forcing the award to a question of merit alone, which will effectually prevent that huckstering of public work for the purpose of saving a paltry per cent. in the architect's commission, irrespective of the relative merits of the various designs.

Upon some of the minor specifications of the above series of resolutions, we may justly differ in opinion, but they contain the only true, just, and proper principles upon which we can, in justice to ourselves, enter upon the toils and anxieties of competition. And the sooner the American Institute of Architects submit some such kindred system the better it will be for the interests of our profession and the community.

Address of Judge Daly to the New York Dock Commissioners.

MR. PRESIDENT AND COMMISSIONERS OF THE DOCK DEPARTMENT: I come before you to-day in behalf of the Citizens' Association of the city of New York. The tax levy, six years ago, stated that the greatest need of New York was suitable piers. What was true in that day respecting the needs of this great city is still more true to-day with its enhanced commerce. At last we see a Board organized and appointed to do this very work. You have been created because you were a public necessity. Before this department the Citizens' Association feels differently than it would if it addressed any other department. This department is non-partisan. It is a novelty in the country. It is the first department that was ever organized in the United States to do a single work, although single departments have been in existence for many years in Europe. The advantages of New York are very great. It has a water front of over twenty miles. Its harbor is already made. It was only necessary for commerce to drive a few piles to have a pier sufficient for its wants. These piers are constructed in the same manner that they were by the Dutch two hundred years ago. The Senate Committee appointed to investigate the condition of the piers reported that the condition of the wharves of New York was a disgrace to America. The structures were very bad, and commerce was being driven, by their dilapidated state, to other ports. The committee found no organization to control and protect all the vast dock interests, and deplored the non-existence of some such a body. They believed that the streets should be widened at least a hundred feet, and that a Board should be appointed with arbitrary power to take charge of the piers. Such a Board has been appointed. The first question you have to deal with is: What are the wants of this great city? You have a city which has $1,000,000,000 worth of property, and which is the gateway to a State which possesses $2,000,000,000 worth of property. Great railroad and canal interests centre here. You have a city with twenty-two ferries, transporting 200,000,000 of persons a year. The foreign commerce amounts to $500,000,000 of property in a year. You have 155 wharf structures, 64 owned by the city, and 54 by private individuals. Nearly every lot that these piers are built upon belongs to the State. You have a gigantic trust; the property is worth $30,000,000. The law has given you the power to take the property of private individuals, their wharves, and, indeed, you have absolute control of everything along the water front. Upon this vast estate you now enter as trustees. You have a tremendous property—worth, as I have said, $30,000,000, in your trust for a long time. The city of New York stands as the gateway to the commerce of three continents. You are to provide for that glorious future. You must not make a mistake. You have to provide for certainties of trade of which few men have a conception. The State has surrendered to you the charge of her piers. More than that, it has given you the power, after you have built the piers, to fix the wharf rates. You have another duty as financial agent. The cost of constructing these piers must be very great. You are allowed $3,000,000 a year, and have the right of issuing bonds to the amount of $50,000,000, payable fifty years hence, at a yearly interest of seven per cent. Even this vast amount is but a pittance compared with what other governments have expended in the construction of wharves. The docks of London cost the English government £75,000,000. But it will not be thrown away. The city needs increased facilities for freight. From 1853 to 1868 the freight on the Erie Railroad and Central Railroad increased $12,000,000. After a time, by proper management on your part, these docks will, by their fees, pay off the entire debt contracted for building them. Your work, in fact, is to make New York rich. You are to build, not for to-day, but for all time.

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In connection with the publication of the ENGINEERING and MINING JOURNAL and the MANUFACTURER AND BUILDER, we have frequently received applications from subscribers and patrons to act as their agents in transacting business with the United States Patent Office; and in view of the increasing number and urgency of such requests, we have resolved to add this department to our business. We have accordingly organized

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We have engaged as solicitor and manager MR. CHARLES ROGERS, a well-known expert in this department. Being a practical mechanic, and having been an examiner in the Patent Office at Washington for a number of years, besides enjoying an experience of more than twenty years as a solicitor of patents, Mr. ROGERS is intimately acquainted with all the details of the business, both in and out of the office.

The specifications, drawings, etc., prepared in our office, will be found to compare favorably with those prepared by any other establishment, while the intimate acquaintance of our manager with the routine of business in the Patent Office, gives us a decided advantage in managing difficult cases.

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For first Government fee, stamp, etc.	$16
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If the case has to be appealed, the applicant pays the Government fee on appeal, $10; but we shall ordinarily make no additional charge for our services. The first two items are payable when the application is sent in, and the second Government fee when a patent has been allowed. Before an appeal is taken, in any case, the applicant will be fully advised of all facts and charges, and no proceedings had without his sanction; so that all inventors who employ our agency will know in advance what their applications and patents are to cost.

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Inventors who reside out of New York, and wish to procure a patent, need not go to the expense of visiting this city or Washington, but may send us a model of their invention, or a sketch and brief description; this will enable us to decide as to its probable novelty and patentability, and we can proceed at once to prosecute the case. We shall, however, be glad at all times to see our friends from any section, and give them such information as we are possessed of relating to patents, free of charge. A Post-office order for $16, to pay the first Government fee and stamp duty, should be sent along with the model; our fee $30 to $40, being payable as soon as the application is ready to be sent to Washington.

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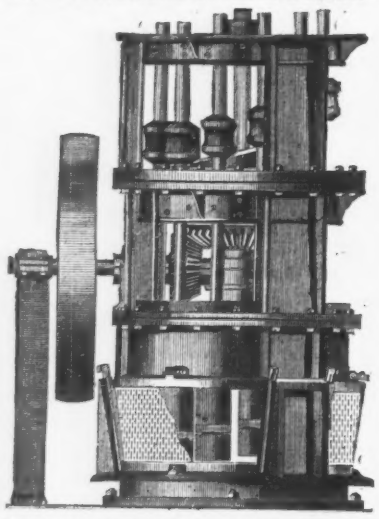

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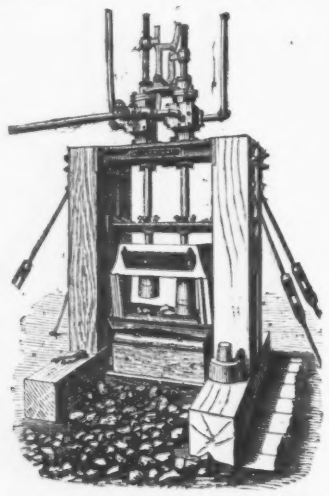

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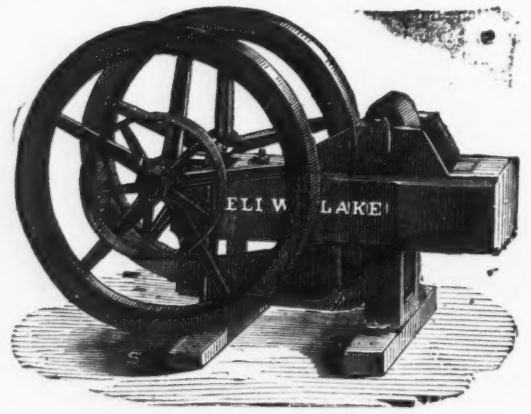

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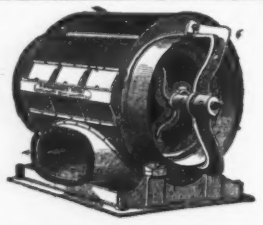

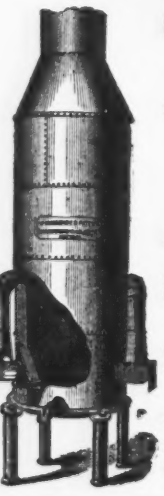

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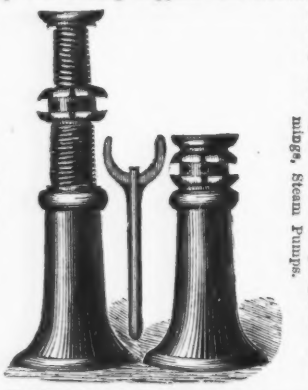

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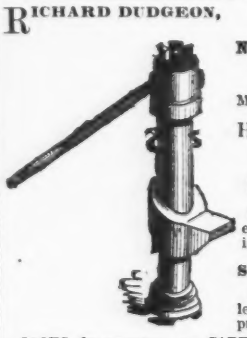

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No. 1. For paving Christie street, from Division street to Grand street, with stone blocks.

No. 2. For paving Eighty-sixth street, from Third avenue to East River, with stone blocks.

No. 3 For paving Elizabeth street, from Grand street to Bleecker street, with stone blocks.

No. 4. For paving Seventeenth street, from First avenue to East River, with stoneblocks.

No. 5 For paving Sixty-fourth street, from Third avenue to Fifth avenue, with stone blocks.

No. 6. For paving Forty-second street, from Tenth avenue to Hudson River, with stone blocks.

No. 7. For paving Forty-third street from Eighth avenue to Hudson River, with stone blocks.

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No. 10. For sewer in Water street, between Moore street and Coenties slip, and Front street, between Montgomery street and Gouverneur street.

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Blank forms of proposals, together with the specifications and agreements, can be obtained on application at this office.

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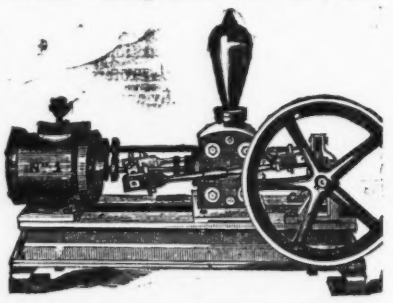

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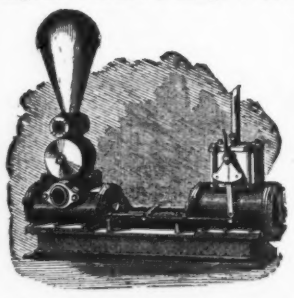

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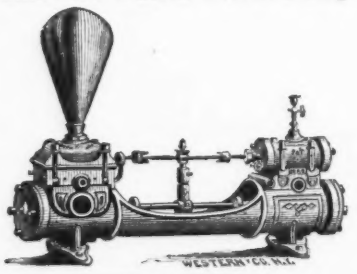

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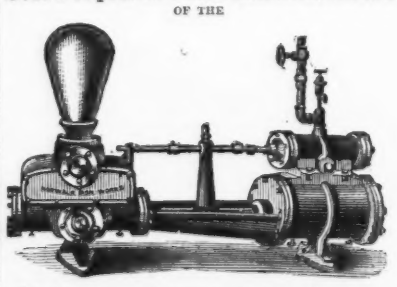

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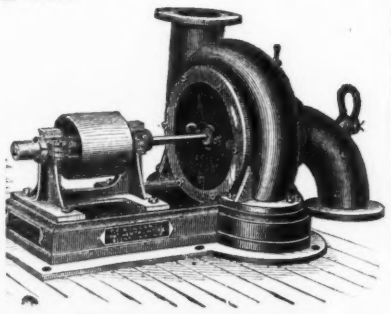

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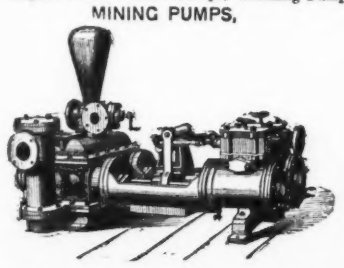

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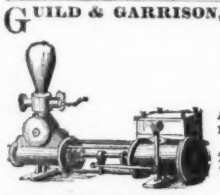

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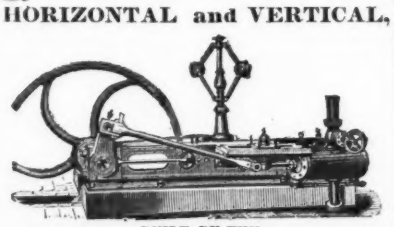

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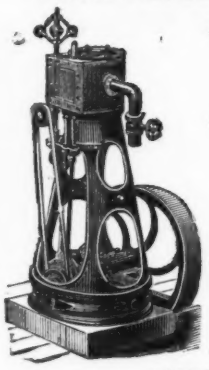

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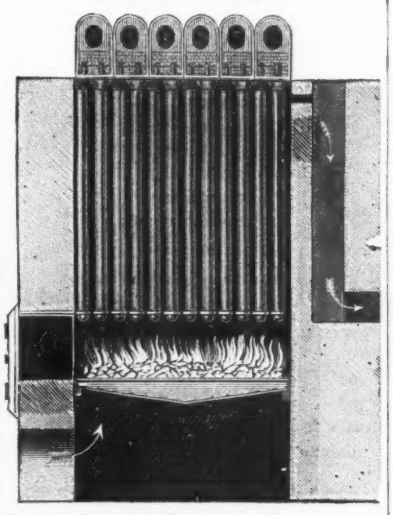

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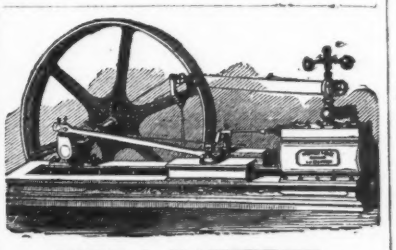

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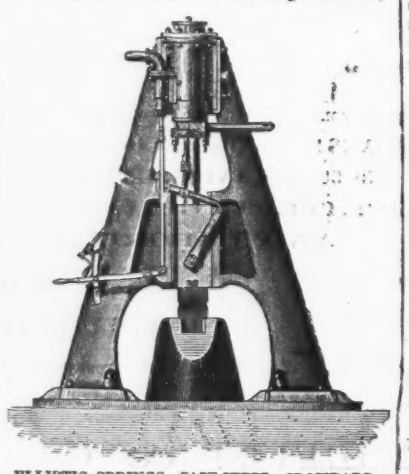

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